
BUSINESS INCUBATORS: FROM THEORY TO PRACTICE

Η ΕΡΓΑΣΙΑ ΥΠΟΒΑΛΛΕΤΑΙ ΓΙΑ ΤΗΝ ΜΕΡΙΚΗ ΚΑΛΥΨΗ ΤΩΝ ΑΠΑΙΤΗΣΕΩΝ ΜΕ
ΣΤΟΧΟ ΤΗΝ ΑΠΟΚΤΗΣΗ ΤΟΥ ΔΙΠΛΩΜΑΤΟΣ:

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AN OVERALL VIEW

This thesis is a theoretical and practical approach of the incubation process in Greece. It is structured in parts in order to examine all the different components of the concept of incubation. The structure that is followed, aims at providing the reader with all the necessary information in relation to the general framework of incubators and to cover all the related fields concerning the incubation process.

PART 1: The opening part of this thesis explains the transition to the new knowledge-based economy, in order to be better informed about the changes in the economic environment that led to a new type of entrepreneurial activity.

PART 2: This part, examines the basic concepts of the incubation framework, and presents the necessary theoretical background. This part provides a first approach to ideas such as Venture Capital, S&T Parks and the importance of Partnership. After a brief reference to the policy framework of the E.E about the incubation activity, the second part concludes with an extend description of the evolution of the type of incubators and with an integrated presentation of the different types of incubators that we meet today.

PART 3: The third part presents an integrated model of the incubation process, and provides an overall description of the incubation activity. The reader can be efficiently informed about the various functions of the incubation process through this extend report on each incubator's operating processes.

PART 4: This part is a complete presentation of the incubation activity in Greece. In the fourth part of this thesis, there is a description of the current economic environment with references to the national innovation system that supports the incubation activity, and a detailed report of the Greek incubators.

PART 5: The final part is a conclusive view of the writer of this thesis. An attempt is made in order to support the incubation activity as an effective business practice in the case of Greece and to examine the political and economic perspectives that will ensure its viable growth.

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ABBREVIATIONS

BICs	BUSINESS AND INNOVATION CENTERS
CPERI	CHEMICAL PROCESS ENGINEERING RESEARCH INSTITUTE
CTT	CENTER OF TECHNOLOGY TRANSFER
EIS	EUROPEAN INNOVATION SCOREBOARD
FORTH	FOUNDATION OF RESEARCH AND TECHNOLOGY HELLAS
GEM	GLOBAL ENTREPRENEURSHIP MONITOR
GERD	GROSS EXPENDITURE ON R&D
GSRT	GENERAL SECRETARIAT FOR RESEARCH AND TECHNOLOGY
H-IRC	HELLENIC INNOVATION RELAY CENTRE
IASP	INTERNATIONAL ASSOCIATION OF SCIENCE PARKS
IASP	INTERNATIONAL ASSOCIATION OF SCIENCE PARKS
ICT	INFORMATION AND COMMUNICATION TECHNOLOGIES
MIRTEC	METALLURGICAL INDUSTRIAL RESEARCH AND TECHNOLOGY CENTRE S.A.
NBIA	NATIONAL BUSINESS INCUBATION ASSOCIATION
NTBF	NEW TECHNOLOGY BASED FIRM
NTUA	NATIONAL TECHNICAL UNIVERSITY OF ATHENS
PSP	PATRAS SCIENCE PARK
RTD	RESEARCH, TECHNOLOGICAL DEVELOPMENT AND DEMONSTRATION
S & T PARKS	SCIENCE AND TECHNOLOGY PARKS
SCEP-C	SCIENCE AND TECHNOLOGY PARK OF CRETE
SME	SMALL MEDIUM SIZE ENTERPRISES
TBI	TECHNOLOGY BUSINESS INCUBATORS
TCPL	TECHNOLOGICAL AND CULTURAL PARK OF LAVRION
TEA	TOTAL ENTREPRENEURIAL ACTIVITY
TEPATHE	TECHNOLOGY PARK OF THESSALY
TPA	TECHNOLOGY PARK OF ATTICA
TTP	THESSALONIKI TECHNOLOGY PARK
VC	VENTURE CAPITALS

PART 1 : A THEORETICAL APPROACH

1.1 A NEW ERA

During the 1900's a first systematic shift has taken place, from the agricultural era to the industrial era. Nowadays, we are experiencing the shift from the industrial era to the information era.

With the appearance of the factory in the industrial age, the centralization of the means of production gradually developed. This process had the effect of moving millions of people from the countryside into the cities and changing the measure of time from seasons to seconds. Manufacturer-based capitalism placed the means of production (factories, industries) and the means of distribution (ships, planes, trains, automobiles) firmly in the hands of few people. This proprietary elite then used the state to ensure that all natural resources were removed from the public sphere and placed under the "management" and control of private industries.

Yet as we move toward the third millennium, the emerging economic paradigm of the wired, digital, Information era is beginning to undermine the structural relationships of manufacturer-based capitalism. As a result of the information age, economies are moving away from dependency on centralized manufacturing to distributed information creation, processing, and dissemination.

This new era has several definitions based on different theories. At the same time, we talk about information society (knowledge is forming the main productivity factor), network society (new communication technology is connecting people), post-industrial society (change in production paradigm), service society (emphasis on services instead of production), expert society (increasing importance of skilled people and experts), learning society (learning ability becomes a critical factor), postmodern society (modernization leads to individualism), innovation society (innovation is the driving force of economic growth), risk society (risks and uncertainty are increasing in society) and consumer society (consumer needs steer economic activities). These definitions reflect the different points of view of assessing the development we have been

experiencing during the recent years. Each of these definitions emphasizes different phenomena embedded in the change of present techno-economic paradigm, and each of them builds a basis for the assessment of the requirements of the changing environment. The information era has begun in earnest now that the primary commodity in Western Capitalism is information. This economic transformation is occurring simultaneously with a structural shift in the nature of information. In the old economy, information was paper-based, centralized, and isolated. In this new economy, information is digital-based, wired (networked) and decentralized (distributed). This transition to the new economy has implied the establishment of a more complex technological environment featuring the emergence of new businesses and markets, a rise in technological interrelatedness between different productive activities, and new forms of communications and cross-border restructuring. This change in the socio-techno-economic model of the past, resembles a paradigm shift..

1.2 THE THEORY OF SCIENTIFIC REVOLUTION-PARADIGM SHIFT

The concept of a “paradigm shift”, and the difficulty sometimes experienced in making the transition from the old way of thinking to the new way of thinking, is not a new concept in the world of science. This phenomenon, as it applies to science, is superbly articulated in the classic work, “The Structure of Scientific Revolutions”, by Thomas Kuhn in 1962. In this book, Kuhn attempts to explain how changes and revolutions occur in the physical sciences. A specialist in the history and philosophy of science, he did not intend for his ideas to be necessarily applicable to the social sciences, but his work has had a great impact, and many commentators see it as an explanation of how changes have occurred in the past, and of the forces currently working either to promote further change or, indeed, to prevent change.

Throughout thirteen succinct but thought-provoking chapters, Kuhn argued that science is not a steady, cumulative acquisition of knowledge. Instead, science is “a series of peaceful interludes punctuated by intellectually violent revolutions”¹, which he

¹ Nicholas Wade, writing for Science

described as “the tradition-shattering complements to the tradition-bound activity of normal science”. After such revolutions, “one conceptual world view is replaced by another”.

The “paradigm” is Kuhn’s central concept, and it is integral to concept of the scientific community². However, he was not the actual inventor of the term; it is defined in the Oxford English Dictionary as an exemplar, or an accepted model or pattern. Kuhn took this standard definition and extended it by saying that a paradigm is capable of development and further articulation.

A paradigm is defined by Kuhn as a “disciplinary matrix”, that is a set of ideas, models, values and attitudes accepted by members of the scientific community. He also uses the term “normal science” to describe the day-to-day activity of a scientific community. For him, normal science deals with questions as they come up. The members are involved in the modification of an existing paradigm and in applying the existing paradigm to a variety of problems. They are not concerned with questioning the paradigm or inventing new ones.

In pursuing normal science, the scientists are concerned with “puzzle-solving” which is a category of problems that test the ingenuity and skill of the scientists, but they are also problems that can be solved with the application of the current paradigm. If the paradigm continues to solve the puzzles, and if there are no serious problems that cannot be explained by the paradigm, then there is no impetus for change. However, if the scientists come to realize that some important aspects of reality cannot be solved by the paradigm, then Kuhn says that the science has entered into a phase of “anomaly and crisis”. During this crisis, new ideas, perhaps ones previously discarded, are tried.

² Kuhn describes a “scientific community” as a group of scientists having a similar education and being acquainted with the same scientific literature. There is usually a professional journal and a professional society to which they belong, and they attend special conferences devoted to their particular branch of science. There are also informal communication networks between the members, they circulate drafts and proofs of their articles to one another, they correspond on matters of professional interest, and they frequently cite one another in a complex network of citation linkages. Accordingly, the scientific community are the “producers and valuers of scientific knowledge”; it becomes the judge of the research of its members, and the members accept the ideas and the solutions currently adopted by the community.

Eventually a new paradigm is formed, which gains its own new followers, and an intellectual "battle" takes place between the followers of the new paradigm and the hold-outs of the old paradigm.

1.3 THE KNOWLEDGE ECONOMY

The source of economic value and wealth today lies less in the production of material goods and more in the creation and manipulation of information, knowledge and ideas. For the last two hundred years, neo-classical economics has recognised only two factors of production: labour and capital. Knowledge, productivity, education, and intellectual capital were all regarded as exogenous factors that are, falling outside the system. New Growth Theory is based on work by Stanford economist Paul Romer and others who have attempted to deal with the causes of long-term growth, something that traditional economic models have had difficulty with. Following from the work of economists such as Joseph Schumpeter, Robert Solow and others, Paul Romer, has proposed a change to the neo-classical model by seeing technology, and the knowledge on which it is based, as an intrinsic part of the economic system.

The cornerstones of this emerging economy are mainly ideas, information, knowledge and experience. The rules of the knowledge economy are fundamentally different than those in the industrial era. Increasingly, the economic landscape is being molded not merely by physical flows of material goods and products, but more importantly by intangible value and streams of data, images and symbols.

This important shift in the economic thinking is rewriting the rules of business and forcing a radical restructure of corporate value. The industrial era enterprise models are no longer adequate to meet the dynamic conditions of a continuous world market. Knowledge intensive enterprises are calling forth a new approach to work, organizations, accounting and business.

In the procedure of creating wealth, knowledge is not only ahead of the traditional factors of production, but it is also an infinite resource that doesn't deplete with use. Knowledge as well as ideas are unlimited economic goods that can generate increasing returns through their systematic use and exploitation. The gap between a firm's market

value and its tangible asset value is widening, something that can be explained through each company's stock of knowledge.

1.4 INNOVATION AND THE KNOWLEDGE ECONOMY

Today's "Knowledge economies" are seeing the emergence of new paradigms for innovation and the advance of knowledge in relation to economic production. This is not because either knowledge or innovation are new ingredients of economic growth. Rather, against a background of a rapid acceleration in the development of knowledge, a revolution in the instruments of knowledge and a necessary redefinition of some of its components, the drivers of knowledge advance are also inevitably changing. Thus, the process of inventing, developing and bringing to users a 21st century microelectronic product is very different from the equivalent process in the case of, say, the light-bulb in the 19th century.

According to the real world of business, the key for sustainable competitive advantage is the knowledge that is difficult for outsiders to copy, as well as the ability to rapidly develop new knowledge. That is exactly how each company should use value innovation in order to sustain a continuous growth and a successful competitive strategy. Value innovation is not about striving to outperform the competition, nor about segmenting the market and accommodating customers' individual needs and differences. Value innovation makes the competition irrelevant by offering fundamentally new and superior buyer value in existing markets.

The process of innovation, which is a fundamental aspect not only in firms, but also in the growth of regions and national economies, shifts from the closed to the open model of innovation. The central idea behind open innovation is that in a world of widely distributed knowledge, companies cannot afford to rely entirely on their own research, but should instead buy or license ideas (i.e. patents) from other companies. In addition, internal ideas not being used in a firm's business should be taken outside the company (e.g., through licensing, joint ventures, spin-offs). In contrast, closed innovation refers to processes that limit the use of internal knowledge within a company and make little or no use of external knowledge.

Prior to World War II, closed innovation was the paradigm in which most firms operated. Most innovating companies kept their discoveries highly secret and made no

attempt to assimilate information from outside their own R&D labs. However, in recent years the world has seen major advances in technology and society that have facilitated the diffusion of information. Not the least of these advances are electronic communication systems, including the internet. Today information can be transferred so easily that it seems impossible to prevent. Thus, the open innovation model states that since firms cannot stop this phenomenon, they must learn to take advantage of it.

In this economic frame, there are many small knowledge-based firms with a high growth rate that struggle to gain their place in the chain of innovation.

1.5 INCUBATORS AND THE ECONOMY OF KNOWLEDGE

Many researchers and authors have described the forms and characteristics of the knowledge economy. This new, technology-based economy is arguably the most significant characteristic that defines metropolitan areas, regions, and states that are economically flourishing. It is a fact that knowledge economy dominates the attention of governors, regional economic development officials, and average citizens for a variety of reasons.

Given the high levels of skills and educational qualifications that knowledge companies demand, and the fact that knowledge companies typically are built around new technologies and cutting-edge science, states now view colleges and universities as key assets in their economic objectives. Universities can be a source of new knowledge through research and development, highly skilled graduates, and various other industry-building partnering activities (Tornatzky et al., 2002).

It is little surprise that every state, region, and metropolitan area wants to participate in the knowledge economy and its inherent entrepreneurial activity. Unfortunately, for many of those aspiring regions, most new economy activity occurs in a few cities and a fewer number of states. Many regions and countries are still making the final structural transitions from an economy dominated by heavy manufacturing, with large assembly and production facilities linked to a highly structured and disciplined supplier chain of many smaller producers of parts and components.

For universities and federal research facilities that wish to become engines of technology transfer, the importance and rationale for links to incubators are evident. Similarly, those

regional economic development organizations that aspire to growing a knowledge economy have become increasingly focused on partnerships with universities and business incubation programs. Business incubators accelerate the successful development of entrepreneurial companies through an array of business support resources and services, developed or orchestrated by incubator management, and offered both in the incubator and through its network of contacts. A business incubator's main goal is to produce successful firms that will leave the program financially viable and freestanding. These incubator graduates have the potential to create jobs, revitalize neighborhoods, commercialize critical technologies and strengthen local and national economies. Critical to the definition of an incubator is the provision of management guidance, technical assistance, and consulting tailored to young growing companies. Incubators usually also provide clients access to appropriate rental space and flexible leases, shared business services and equipment, technology support services, and assistance in obtaining the financing necessary for company growth.

Among the first generation of incubators, the majority focused on relatively low technology businesses, typically in the service and manufacturing sectors. Gradually, the incubation industry expanded in size and sophistication of businesses represented among client companies. Currently, the National Business Incubation Association—the international membership organization for those professionally associated with business incubation and enterprise development—has about 1,000 members, representing approximately 600 incubation programs.

Growing in importance and impact is the subgroup of incubators focused on new, technology-based companies. Many of these have affiliations with major research universities or federal labs and research facilities. Typically, these incubators have tenant or affiliate companies with products or services deriving from information technology or advances in the biological sciences, although the technological concentrations have changed along with advances in the underlying science. As such, they represent the incubation industry's increasingly visible role in the continuing development of the world's knowledge economy.

One of the defining characteristics of the knowledge economy is the importance of entrepreneurial enterprises and people. Small, flexible companies seem to be particularly

nimble at exploiting the potential of new knowledge and technology, getting to market faster, and providing a venue that attracts the creative and talented (National Academy of Engineering, 1995). In parallel, new approaches to capital formation and investment have evolved that match the needs and characteristics of knowledge economy entrepreneurs. From an economic development perspective, small companies are a significant, and arguably preeminent, source of new jobs in the economy (Birch, 1997). Whatever the specific value they add to their communities in terms of job creation and other benefits, it is clear that any region aspiring to have a robust, growth economy had better have a strong entrepreneurial, technology-based sector. Moreover, in developing that sector communities and regions can make good use of technology business incubators.

2ND PART: INCUBATION FRAMEWORK

INTRODUCTION

The concept of “incubation” is probably most known in hospitals and maternity clinics as a procedure for the premature borne children. Embryos that are not in position to withstand or live in a normal environment the way a normal healthy child would, are placed in incubators until they become capable of living on their own. The incubator has a simulated environment and monitors the life systems so that the child comes to a stage from where it can be nurtured and brought up like a normal child.

In order to understand the concept of a business incubator, we should correlate the above approximation with other terms, by simply regarding the premature child as a new small business and the medical incubator as a sheltered environment for young growing firms. Thus, incubators nurture young firms, helping them to survive and grow during the startup period when they are most vulnerable.

It is generally recognized that only few businesses make it through their early years, especially those concerning projects and ideas that have a high degree of uncertainty with regard to success. High entry barriers, management problems and the intense global competition are frequently identified as the general reasons for business failure. Incubators provide the assistance that fills the knowledge gaps, reduces early-stage operational costs such as rent and service fees and establishes entrepreneurs in a local enterprise support network. In particular, they provide hands-on management assistance, access to financing, shared office services, and access to equipment and flexible leases.

The concept of Business Incubation has evolved in the last 30 years from experiences with the earlier industrial estates and small enterprise service centers. The first generation incubators in the 1980s essentially offered affordable space and shared facilities to carefully selected entrepreneurial groups. In the 1990s, the need was recognized for supplementing the workspace with counseling, skills enhancement and networking services to access professional support and seed capital, for tenants within the facility and affiliates outside. This led to the second generation incubator. Today the third

generation model is more like an international enterprise center, providing a platform for convergence of equity capital and management consulting services.

Business incubators, especially those with a technology orientation, have grown rapidly to over 4,500 world-wide. Of this world total number, depending on how these are defined, roughly one-third each are in the U.S.A., the other industrial countries (in Europe, Australia, Japan, Canada) and the industrializing and restructuring countries. Each group can benefit by exchanging experiences on the good (better or best) practices as well as on the failures.

Typically, those in the developing countries face unique problems due to the relatively weak infrastructure, inadequate state support, repressed entrepreneurial attitudes and other factors related to their history, geography, culture and other conditions. Nevertheless, they constitute approximately half of the world total. The uneven performance and poor sustainability in some situations have become serious issues with the governments and sponsors who support them. Technology parks and technology incubators have a symbiotic relationship that creates the potential of mutual benefits.

Actions at the global, national and local levels call for a range of public-private partnerships among business, university, research and government. The direct support system, including business incubators and technology parks are one component of the overall competitiveness system.

2.1 INCUBATION CONCEPTS (VENTURE CAPITAL, PARTNERSHIP, SCIENCE & TECHNOLOGY PARKS)

2.1.1 VENTURE CAPITAL

2.1.1.1 THE CHANGE OF BUSINESS ENVIRONMENT

There are several factors that have a great influence on the global economic and business landscape, such as technological innovation and the evolution of entrepreneurship. These forces are dramatically changing the typical figure of businesses and firms, by altering the circumstances in which those firms used to operate.

A typical example of an important change in the business framework is the reduction in communication costs, due to technological progress. Therefore, a bigger information flow has now been recorded which leads to a grater market transparency, allowing buyers and sellers to compare costs and prices in different countries. So, as the importance of locational and transport economics fades, the big winners in the business arena will be all those technically savvy service businesses that are able to compete directly on price and quality.

Another factor that restructures the business environment is the state of free trade and open markets. This new force is likely to alter the economic scenery not only in individual countries but worldwide also. Shrinking logistical and communication costs, along with new organizational designs, have enabled multinational corporations to function as truly global companies, introducing their newest products worldwide and effectively share knowledge across country units. This hyper-competition is additionally fueled by the fact that many industries now have several multinational corporations competing against each other on a worldwide basis, rather than a few local companies and only one multinational corporation competing in each market.

Moreover, an outbreak of technology-based goods, services and processes hits the market every day, improving the quality of lives in some ways, while also creating complexity and dislocation. In particular, the pace of progress in information and communication technologies (ICT), microelectronics, biomedical sciences, nanotechnology, robotics, new materials, space and other advanced fields continues to quicken, and in turn, to change the living and working environment. Thus, the key to

limit this continual feeding of competition is to gain a sustainable competitive advantage by maintaining a knowledge, which is difficult to copy, and by rapidly developing new innovative products.

Under these conditions, companies come along with a totally new business environment. In order to sustain their viability, they must stay aligned with the complex metamorphosis from the 20th century corporate style towards the New Economy culture. In facilitating this process, the entrepreneurial venture is playing a catalytic role.

2.1.1.2 DEFINITION OF VENTURE CAPITAL

Before mentioning the relation between venture capitals (VC) and the incubation process, it would be useful to refer to some lineaments of this concept. In general, venture capital is one of the most relevant sources of finance for innovative companies to fund their investments, and it consists of funds raised on the capital market by specialized operators. Venture capital funds buy shares or convertible bonds in the company. They do not invest in order to receive an immediate dividend, but to allow the company to expand and ultimately increase the value of their investment. Hence, they are interested in innovative firms with very rapid growth rates.

The composer of the term "venture capital" is unknown, and there is no standard definition of it. It is however, generally agreed that the traditional venture-capital era began in 1946, when General Georges Doriot, organized American Research & Development (AR&D), the first public corporation specializing in investing in illiquid securities of early stage issuers. Therefore, one way to define traditional venture capital is to repeat General Doriot's rules of investing. An investment process entailing Doriot's rules is by definition, a venture-capital process. According to Doriot, investments considered by AR&D involved:

- new technology, new marketing concepts, and new product application possibilities,
- a significant, although not necessarily controlling, participation by the investors in the company's management,

- investment in ventures staffed by people of outstanding competence and integrity (herein the rule often referred to in venture capital as "bet the jockey, not the horse"),
- products or processes which have passed through at least the early prototype stage and are adequately protected by patents, copyrights, or trade-secret agreements (the latter rule is often referred to as investing in situations where the information is "proprietary"-proprietary information-),
- situations which show promise to mature within a few years to the point of an initial public offering or a sale of the entire company (commonly referred to as the "exit strategy"),
- opportunities in which the venture capitalist can make a contribution beyond the capital dollars invested (often referred to as the "value-added strategy").

The term "venture capital" is grammatically multifaceted. General Doriot's exegesis specifies a certain type of investment as characteristic of the venture universe. He assumes, a priori, the proposition that venture capital involves a process, the making, managing and ultimately selling of investments. In addition, this term can be applied in a number of ways: to investments, people, or activities. However, most of all is an activity involving the investment of funds. It ordinarily involves investments in illiquid securities, which carry higher degrees of risk -and commensurately higher possibilities of reward-than so-called traditional investments in the publicly traded securities of mature firms.

The venture-capital investor ordinarily expects that his participation in the investment will add value, meaning that the investors will be able to provide advice and counsel designed to improve the chances of the investment's ultimate success. The investment is made with an extended time horizon, required by the fact that the securities are illiquid. Since the most celebrated rewards in the past have generally accrued to investments involving advances in science and technology to exploit new markets, traditional venture capital investment are often thought of as synonymous with high-tech start-ups. However, that is not an accurate outer boundary, even in the start-up phase. But, whether high or low tech, the traditional venture capitalist thrives when the companies in which he invests have an advantage over potential competition in a defined segment

of the market, often referred to as a “niche”. The product or service is as differentiated as possible, not just a commodity. Exploitation of scientific and technological breakdowns has historically, been a principal way, but not the only way, for emerging companies to differentiate themselves from their more mature and better-financed competitors.

2.1.1.3 VENTURE CAPITAL AND INCUBATORS

Innovation is a priority in most countries throughout the world, and regional and national competitiveness and economic growth are increasingly dependent on making the appropriate conditions supporting risk-taking and innovative ideas. Economic growth, has in recent years, been coupled with access to information and communication technology, the ability among firms to introduce organizational changes and the level of human capital together with research and development in small and large firms. Today, the field of entrepreneurship is constantly expanding and all the initiatives supporting the development of the entrepreneurial activity are crucial.

Together with incubators, venture capital contributes to economic growth in small and medium sized enterprises (SME). While incubators, by nurturing young firms, provide a favorable environment for their birth and early development, venture capital funds represent the financial means ensuring further development of successful entrepreneurial ideas. Therefore, the two roles are complementary and an efficient collaboration among incubators and venture capitalists can potentially guarantee a business climate where enterprises can grow smoothly and rapidly.

However, while a number of studies on incubators primarily concentrate on showing best practices, guidelines for fostering new start-ups, incubation management as well as evaluation and effectiveness of incubator programmes on startups, only little research has been devoted to investigate to what extent incubators and venture capital investors are successful in their attempts to collaborate.

On the contrary, sometimes the line between these two parts becomes blur and indistinguishable, since many venture capitals offer incubator services and many incubators offer venture capitals services. Strictly speaking, an incubator helps a small company to grow by offering business services and advice, while a venture capital fund helps the company raise capital.

2.1.2 PARTNERSHIP

The concept of partnership is another term we need to examine in reference to the incubation process. The success of an incubator depends highly on the capability of the management to provide services through partnerships with a range of players. As it will be later explained, the incubation process includes the participation of several parts like national and local governments, the public and private sector, the academic community and other research institutes as well.

The role of the government to the process of incubation is essentially to develop an applicable technical infrastructure, an appropriate policy framework and initial finance, in order to help catalyze the venture creation process and to enhance but not displace the market. Most sponsors and donors nowadays are seeking to subsidize the market of small enterprises that are likely to grow and develop.

On the other hand, the private sector invests in an incubator when its effectiveness is demonstrated, in order to acquire innovations, or even for fast profits. In addition, the technical university and research institute constitute the knowledge base, for formation of skills and innovations. The national and global professional networking and the business community involvement, also provide the underpinning of the incubators' support.

In the promising economy environment, the linkages in the above system are often unstructured and weak, and usually the weakest links are with the universities, research institutes and private sector.

2.1.2.1 GOVERNMENT'S ROLE

Government's initial support to incubators makes sense under specific conditions:

- When it helps overcome market constraints, improves the access to information, seed finance and divisible workspace, and support services -- not freely available or affordable. Start-up ventures, due to their poor initial resources and perception of high risks are at considerable disadvantage,
- Extends the state's role in providing public goods, knowledge, research, infrastructure,

- Becomes a visible symbol of the state's commitment to the creation of good jobs (direct, indirect and through multiplier effects),
- Stimulates innovation and entrepreneurship as prime forces in the new economy,
- Promotes the cultures of technology commercialization, risk-taking, teamwork, sharing,
- Reduces the costs and consequences of business failures, and facilitates the transition from a command to a market economy,
- When it empowers backward areas (urban and rural), youth and women entrepreneurs, and promotes employment in the longer term,
- Helps develop synergies between university, research, state and civil society,
- When support is limited to initiate the establishment, not a continual operating subsidy. Competitive tendering among incubators for government or sponsor support can help enhance performance,
- Generates taxes paid by corporations and workers, typically in excess of net subsidy, and raises incomes, sales and exports for the community and country,
- When there is customer satisfaction at the services received, common costs saved and faster time to market, as well as public satisfaction at the benefits to the state and community. While the immediate customer is the entrepreneur being incubated, the ultimate customer is the government that provides initial subsidy in expectation of benefits to the community such as taxes and jobs.

A very successful similitude can here be made, in order to better understand the role of government in the incubation process. We could regard an entrepreneur as a child coming to a toyshop (incubator) and wanting expensive toys (support services). At the same time, its parent (the government) wants to know whether this toy is in deed useful and really safe.

The initiation of incubators in Uzbekistan starting 1994, is a good example of self-owned businesses, hitherto unknown, leveraging public policy towards becoming friendlier to them. This was also true in Poland and China. The difficult task is always to mobilize strong government support without excessive government interference. The ideal state is to realize the triple helix of good state-university-business collaboration.

2.1.2.2 KNOWLEDGE-SYSTEM'S ROLE

There is significant potential for partnerships between a technology-based incubator and an affiliated technical university that are both sited in proximity to a technology park, or elsewhere. All players in this case could affiliate towards the same direction, and they could also turn this collaboration to profit.

Nevertheless, in such systems of partnerships, there can also be conflicts due to the different purposes of each player. To be more specific, the common goal of the incubator and the technology park is to support and manage rapid enterprise-creation while the culture of the university is to provide learning, within its longer cycles of the academic calendar and student graduation. However, some of the most successful European and U.S. incubators today, are linked to universities³.

A technology business incubator could be related to universities, but that doesn't mean that it is university administered or controlled. The outlook of university administrators is often technical, bureaucratic or political and rarely entrepreneurial. When the university is willing to provide a vacant space for the incubator and cover some of its costs, it is not easy for the incubator board and management to fend off attempts at interference in operations. The professors may see the incubator tenants as sources of consulting income and business experience as well as opportunities for graduate students to write dissertations and earn some money. The incubator tenants may not be fully aware of the faculty's strengths or potential for technology transfer.

The major differences between the culture of universities and enterprises are:

- Time-cycles: Most professors and students are driven by the academic schedule and by longer academic cycles. By contrast, entrepreneurs need to respond to the cycles of the markets being targeted.

³ Good examples of the usefulness of linkage to a technical university are the incubator programs in Korea, Taiwan and Uzbekistan, the large Brazil system with strong support from public-private agency like SEBRAE, those at the Indian Institutes of Technology at Bombay and Delhi, the "techno-parks" (really technology incubators) supported by KOSGEB, the new UTech Innovation Center, Jamaica, and Ruhuna Business incubator in Sri Lanka.

- Urgency: At the university, schedules may relate to preparing final exams, while for business this means meeting payroll and delivering products to meet dead lines.
- Institutional accounting vs enterprise accounting: For the university the incentive is to spend what is in their budget, so a success for them would be to create a bigger budget allocation and more staff. They do not need to generate income to cover their expenses, a fact that explains their basic objective, which is to protect university reputations and not take risks.
- Lack of experience among faculty of working with small companies, differences between the culture of researchers to publish and of business executives to be secretive, difficulty in accepting advice, and discomfort in public roles. Faculties also tend to be highly autonomous, narrowly focused, publications-driven and to operate in a bureaucratic framework. Spin-offs from faculty research to incubator company are quite rare in developing countries. There is also the reluctance to sully one's academic reputation by engaging in commercial activity.

On the one hand, technology business incubators can advantage of this linkage with a reputed university, by exploiting the prestige that this institution brings as well as the academic fermentation. The incubator can also benefit by synergies through the use of computer systems, libraries, databases, special scientific equipment, expertise of faculty, internships and part-time employment by senior students.

On the other hand, the university can benefit by the practical demonstrations of technology transfer as well as using each coactive incubator as a “living laboratory” for students and faculty. The challenge in this case is to mobilize the reputation and resources of the university while maintaining the autonomy and mission of incubator management. When the ethical and conflict-of-interest guidelines are clearly drawn, the interactions between faculty and business can be fruitful.

2.1.2.3 CORPORATE SECTOR'S ROLE

Services and manufacturing companies, both private and public, have experience and skills that are of immense value to start up and early-stage ventures. For instance, these companies can:

- Provide mentoring to blossoming entrepreneurs based on their own successes,

- Take equity in the emerging incubator- clients,
- Acquire the know-how developed through licensing agreements,
- Involve the new venture in their supply chain for goods and services,
- Share their business and finance contacts by networking,
- Importantly, serve on the boards of the incubator to bring practical advice.

The above support is of mutual interest as such “father-son” cooperation can help expand the markets for the corporates as well as contribute to economic growth. A main beneficiary of a successful incubation system is the community in which it operates. The incubator clients and graduates create the jobs, incomes and taxes, as well as the culture of innovation and entrepreneurship.

2.1.3 SCIENCE & TECHNOLOGY PARKS

The incubator is often the first building block for a future technology park. Both park and incubator are workspaces that share some features - both typically require initial subsidy and a good business environment.

However, they are quite different in significant respects - the park is essentially a major real estate development for existing research and technology related organizations, while the incubator is for start-up and early-stage ventures that require nurturing. Both are evolving to meet the challenges of commercializing technology and supporting enterprise creation, within the framework of the technological revolution and the liberalizing global markets. According to the National Business Incubation Association (NBIA):

“Research parks (sometimes called science parks or technology parks) are property-based ventures consisting of research and development facilities for technology- and science-based companies. Research parks often promote community economic development and technology transfer. They tend to be larger-scale projects than business incubators, often spanning many acres or miles. Research parks house everything from corporate, government, and university labs to big and small companies. Unlike business incubators, research parks do not offer comprehensive programs of business assistance. However, an important component of some research parks is a business incubator focused on early-stage companies.”

2.1.3.1 S&T PARKS-DEFINITION

According to the International Association of Science Parks (IASP):

“A Science Park is an organisation managed by specialised professionals, whose main aim is to increase the wealth of its community by promoting the culture of innovation and the competitiveness of its associated businesses and knowledge-based institutions.

To enable these goals to be met, a Science Park stimulates and manages the flow of knowledge and technology amongst universities, R&D institutions, companies and markets; it facilitates the creation and growth of innovation-based companies through incubation and spin-off processes; and provides other value-added services together with high quality space and facilities”.

This definition is considered general enough to embrace the different models that exist all over the world, both physical and “virtual”. Other terms such as “Technology Park”, “Technopolis”, “Technopole”, “Technology Precinct”, and “Research Park” can substitute the term “Science Park” in it. Although there may be differences between the various types of parks, projects under these labels share many goals, elements and methodology and therefore, according to IASP, come under this definition.

The most important features of S&T parks, are a long-term lease or purchase of land to build or to rent pre-built space, with physical infrastructure and utility services provided by the park authority. The relationship with a university or research institute is considered a key aspect. The role of government ranges from a major direct role, where the state may provide concessional land, financial incentives and some anchor tenants, to a more laissez-faire role, providing normal infrastructure under commercial terms.

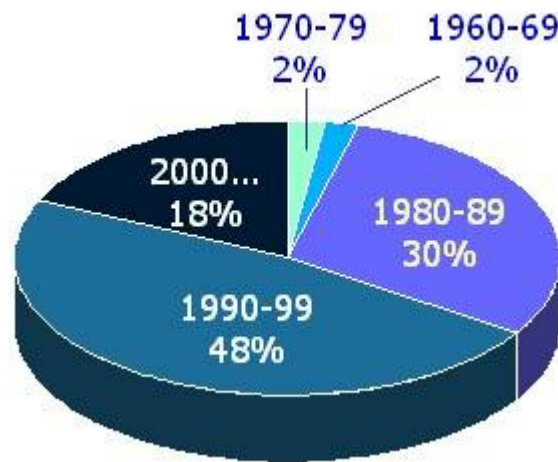
Regardless of its name, the park is essentially an enhanced real estate development, with strong program components, that takes advantage of the proximity to sources of significant intellectual capital, conducive infrastructure and policy environment, and also supports technology-based firms and state institutes in a managed area. Therefore, it facilitates interaction, technology development and economic growth.

For a long-term success, the park must move beyond real estate to real innovation. A technology park represents a major investment of more of 10 million\$, over a long time horizon which expands up to a decade. It is therefore essential to determine, through

competent feasibility analyses and business plans, whether the conditions for attracting research and technology organizations exist, and whether "patient money" is going to be available.

Unfortunately, some technology park developments have performed poorly, and several have taken many years to mature. While varying in levels of performance and success, technology parks have grown steadily, to some 500 worldwide with about 150 in the United States and 50 each in U.K. and France. A majority of the currently existing Science & Technology Parks in the world were created during the nineties. However, it is interesting to notice that a significant 18% of the existing Science Parks have been launched in the first 2 years of the new century, which confirms that S&T Parks are a growing phenomenon. The figure that follows provides more information:

Figure 1: The Creation of S&T Parks



IASP Survey, November 2002. Methodology: on-line questionnaire

Universe: 250 Science / Technology Parks (IASP members)

Sample: 94 Science / Technology Parks

2.1.3.2 TECHNOLOGY PARKS AND INCUBATORS

The phenomenon of S&T parks and incubators appeared spontaneously in the US in the 1950s and 60s. In a process where science and technology play a continuously increasing role in the economic and social development, local concentration of research and production activities created networks of high added value and contributed to the international competitive advantage of these local economies⁴. Since then many European national and regional governments have tried to emulate this process and generate conditions appropriate for S&T parks, technopoles and other similar concentrations of scientific, technological, industrial and commercial activities⁵. At present, more than 900 such organizations operate in Europe⁶. They are supported to a great extent by public funds, in particular for the construction and operation of common infrastructures, provision of services to newly created businesses, etc.

There is the potential for synergy between a technology incubator and a technology park. It could be advantageous to start with the small investment and time requirement of an incubator, making provision of space for a future technology park. The graduating clients can then be re-located in the park. This potential can however best be realized if their goals are broadly similar and the management and operations are meticulously planned from the start for such integration.

It helps if both are under the same governing body and are affiliated to the same research institute or university⁷. Part of the significant income derived from leasing valuable real estate to large companies could be used to cross-subsidize the early-stage groups in the incubator.

2.1.3.3 EXAMPLES OF TECHNOLOGY PARKS IN EUROPE, USA, ASIA.

➤ Technology Parks in Europe

There are currently some 900 science parks and incubators in Europe of which around a third have a technology focus. Leading examples include Aston, Cambridge and Oxford science parks in the UK, Sophia Antipolis in France, and the Mjardjevi Science Park in

⁴ European Commission, 1985, OECD, 1997; Porter, 1991.

⁵ Abetti, 2004.

⁶ European Commission, 2002

⁷ As at the Renneseleer Polytechnic Institute, New York.

Sweden. Most include a combination of incubator units, grow-on space, and sites and premises for larger companies and spin-offs.

The surface area of science parks in Europe varies considerably. The Mjardevi Science Park in Sweden, for example, provides some 700,000 m² of space, which is sufficient to provide accommodation for some 180 firms. Aston Science Park in the UK offers 87,000 m² and has some 97 tenants. In general, a science park with less than 200,000 m² is considered small in a European context, 200,000-600,000 m² is seen as medium sized, and over 600,000 m² is large (half the science parks fall into the first category).

Most European science parks offer a range of rented office space and R&D units. This is sometimes combined with space for companies (particularly 'anchor' tenants) to build their own premises. Aston Science Park, for example, provides units in its Venture Park, ranging from 100 to 500 m². Cambridge is much larger and now has some 40,000 employees in tenant companies. Elsewhere in Europe, with the exception of Sophia Antipolis in France, science parks tend to be smaller. In all countries, there is an emphasis on using linkages with R&D centers and universities to promote spin-offs.

The extent to which academic establishments facilitate spin-offs is a critical issue in many European countries. Enabling factors - intellectual property rights, the availability of venture capital, and - above all - the extent to which universities encourage their students and staff to engage in entrepreneurial activity, differ from one country to another.

➤ Technology Parks in the US

A large proportion of US parks are linked to or sponsored by universities. The median park has about 200 acres, over 200,000 gross square feet of buildings, 12 tenant companies with total 300 employees, and a \$250,000 operating budget⁸. Some are indeed much larger such as Research Triangle Park, North Carolina with 6,800 acres, 57 companies and 33,000 employees⁹. About one-third of the US parks have an operating business incubator.

⁸ Coopers & Lybrand, 1993 survey.

⁹ AURRP Directory, 1993

There is much debate on the real role of the university in stimulating agglomerations of high-tech firms in close proximity. Some point to a significant correlation (Luger and Goldstein, 1991; Wheeler, 1990). Others are more skeptical, citing the more pronounced role of the industrial structure and social environment as well as the difficulties of tracking or measuring knowledge flows. High-tech firms may start around a knowledge base such as a university, but later disperse in the expansion stage to locate closer to their customers.

➤ Technology Parks in Asia

The pre-requisites for a vibrant innovation system are the knowledge bases of scientific research, technology development and technical education. The infrastructure of managed work spaces and enterprise support mechanisms, professionals and venture capitalists have to be attracted to optimize effectiveness. Enormous efforts are required, from the primary school onward, to help transform the cultural constraints and develop the spirit of competition through cooperation. These imperatives are now being appreciated in some Asian situations. Examples from selected countries are given below:

Malaysia: In Malaysia, the recent financial set back has hardly deterred the overall drive to move from an investment-led economy to an innovation-driven system. The Technology Park Malaysia (TPM), inaugurated in 1996, covers 120 acres and involves a state investment of 80 million\$. Located 10 km from Kuala Lumpur, it is in the vicinity of five universities, eight national research institutes and the emerging Multimedia Super Corridor. TPM comprises well-designed innovation-incubation-enterprise houses, a central resources hub and R&D lots, together with excellent residential, recreational and facilities. The integration of services includes a prototype production center, quality control laboratories and venture capital fund under park management.

Singapore: The Singapore Science Park, also starting in 1981, now occupies 270,000 sq m gross floor space, with some 180 local and MNC tenants. It includes an incubator operated by the Singapore Institute of Standards and Industrial Research. An Innovation Center (2,000 sq m with 29 start-up companies) and Technopreneur Assistance Center have been added to provide a range of technical, business, training and shared facilities. Other support for early-stage companies includes finance for innovators, a Data-bank of

Licensable Technologies, venture capital and patent application fund, as well as state agencies providing productivity, quality and design services. The Park has been developed by Technology Parks Pte Ltd, which is also operating a variety of multi-tenant facilities in Singapore and building an Information Technology Park in Bangalore, India.

Japan: At a larger scale are the integrated, government- sponsored science cities such as Tsukuba and Kazusa Akademia Park in Japan . Tsukuba itself has three science parks, and some 50 government research institutes that account for half the national R & D budget. Yet, after 25 years it remains somewhat sterile with limited entrepreneurial and spin-off activity. The Kyoto Research Park , starting a decade ago, includes incubation facilities, On-Research-Training areas, and the Science Center Research Corporation, in alliance with the University City Science Center - Philadelphia , to promote networking and international exchanges.

China: The trend towards integrating the main knowledge and productive forces into a convergent system is exemplified by developments in China . While the overall policy guidance comes from a central administrative office, the implementation efforts are highly decentralized to provincial, district and municipal levels. Starting a decade ago with the Shenzhen Science and Industry Park and the Beijing Experimental Zone , China now has 52 national parks approved by the central Government in special technology zones, 50 provincial parks managed by local administrations, and 30 university-related parks. The policy guidance comes from the State Science & Technology Ministry's TORCH Program and the State Education Commission (Zhang, 1995).

The economy of Shanghai, China's largest city is growing at the rate of 15-20% annually, twice the national rate. It has become the focus for foreign investment, with some 300 joint ventures with MNCs. The technical infrastructure of 45 educational institutions and 300 research laboratories supports seven technology parks and a dozen incubators .

Taiwan: At the Hsinchu Science Based Industrial Park: Over the last 15 years the state has invested US\$ 483 million in infrastructure and educational facilities, including two major universities and the Industrial Technological Research Institute. Four national research laboratories are located in the Hsinchu area. This convergence and strong state support have helped make Taiwan the largest producer in the world of portable

computers (27% of world market), monitors (70%), and image scanners (64%). Companies are being enabled to develop innovative technologies, attract joint ventures, set up research and marketing operations abroad. The parks production value represents almost 10% of Taiwan 's GDP.

In HSIP's fourth expansion phase, the original 1,000 acres are being increased by 385 acres, mainly towards recreational and residential facilities. Starting with a national perspective and bringing the knowledge and productive sectors together are the beginning; the enterprise support complex has then to be further integrated with the neighborhood and region, to form a viable organism which grows.

The spirit of integration into an "Organismic Community" is being taken to its limits at the Tainan Science Based Industrial Park. TSIP could have even more impact than Hsinchu and reach annual sales of over US \$ 30 billion in 15 years. Both are deliberately planned complexes, as at Research Triangle - North Carolina and Sophia Antipolis - France.

TSIP is focused on precision machinery, semi-conductor equipment, and agricultural biotechnology. Targeted activities in biotechnology cover ornamental plants, bio-pesticides, livestock vaccines and aquaculture. In both parks, land is available on lease only, not for sale. The National Science Council is establishing a new Center for Industrial-Academic Research and Development. This will provide an incubation system within TSIP, including prototyping product facilities, counseling, training, information and legal services, and a variety of grant, credit and equity financing arrangements. The park and incubation center will be linked to some eight national universities and six research institutes at Tainan and at Kaohsiung port.

Rapid globalization and advanced ICT call for a new model, a move away from rigid workplace to convergent workspace, more like open towns rather than gated properties. Tech Parks can prosper if they adapt flexibly to these trends, build strategic relationships to their clients and community, at home and internationally. In conclusion, the successful Technology Parks have generated many innovations and jobs, but many have had only limited role in economic development. Since the studies by Massey and Luger/Goldstein in the early 1990s, there have been no agreed metrics on performance,

systematic data collection and rigorous evaluations. The clustering of ventures in the knowledge economy is now producing good results, at lower costs.

2.2 EUROPEAN UNION POLICY CONTEXT

The EU started supporting the development of incubators in mid-1980s as part of its regional policy. Whilst initially EU focused on establishing incubators in “lagging” regions, in recent years it works more on incubators as support for high knowledge-intensive start-ups as part of the “Lisbon Agenda”.

The European Charter for SMEs, adopted in 2000, commits the EU and member states to creating the best possible environment for SMEs. One of the key actions involves promoting the technological capacity of start-ups and small firms. These priorities are central, in turn, to the Lisbon Strategy of making Europe the most competitive and dynamic economy in the world.

Within this context, there is active support for technology-based incubation. EU provides grant aid from a number of sources, in particular the Structural Funds (ERDF, ESF) to cover a proportion of capital and operation costs. Other EU programmes in the field of risk capital financing help incubator tenants. The new Structural Fund guidelines for the 2008-13 period place even more emphasis on business incubation as an instrument of regional development, entrepreneurship, cluster formation, and competitiveness generally. EU programmes providing assistance to incubators include the European Regional Development Fund (ERDF), European Social Fund (ESF) - mainly for training, Leonardo Programme, Sixth R&D Framework Programme, and others.

The Commission's Multi Annual Programme for SMEs provides a framework for coordination of all activities in favor of SMEs. This covers:

- Specific Community measures for SMEs including initiatives to promote entrepreneurship, innovation, and the availability of risk capital financing,
- Grant aid for SME development, for example in the form of subsidized business support services and advice (provided via national and regional authorities),
- Concerted Actions, which aim to promote the exchange of best practice amongst Member States and with the Commission on SME policies.

The Multi Annual Programme for SMEs includes actions relating to the three different stages of a business life cycle (start-up and early development, growth phase, transfer of a business) in three broad policy areas (improving the business environment, stimulating business support measures, increasing the profile of support services). The current version of the Programme proposes more focused action on business services. Its recommendations include, among the key actions to be undertaken, the promotion of lifelong assistance to SMEs by developing and/or improving business services and simplifying access to them. The best Action Plan on “Promoting Entrepreneurship and Competitiveness” set up by the Commission foresees improving the quality of information and advice services among the actions to be undertaken at both European and Member States level.

Business support services also constitute one of the principal themes of the “Concerted Actions”, in which the Commission assists the Member States to identify and exchange best practices. Various fields are covered:

- Concerted Action No 1 - improving the SME environment by simplifying legal, accounting and administrative requirements,
- Concerted Action No 2 - support measures for enterprises which is aimed at developing business services for start-ups and SMEs,
- Concerted Action No 3 - aimed at stimulating SME demand for business support services and addressing underlying market.

More recently, the 2000 Lisbon European Council invited the Commission and the Member States to focus their action in favor of micro and small businesses. Shortly after the Lisbon Council, the Commission adopted the communication Challenges for enterprise policy in the knowledge-driven economy and a proposal for a Council Decision on a Multiannual Programme for Enterprise and Entrepreneurship (2001-2005). This set out the challenges to be faced by enterprise policy over the next five years. The new Multiannual Programme provides a framework of actions in support of the objectives of the Communication. Business incubators and the need to improve benchmarking techniques, have an important role to play in the context of both the above policies, as was emphasized by the recent Lisbon Council meeting.

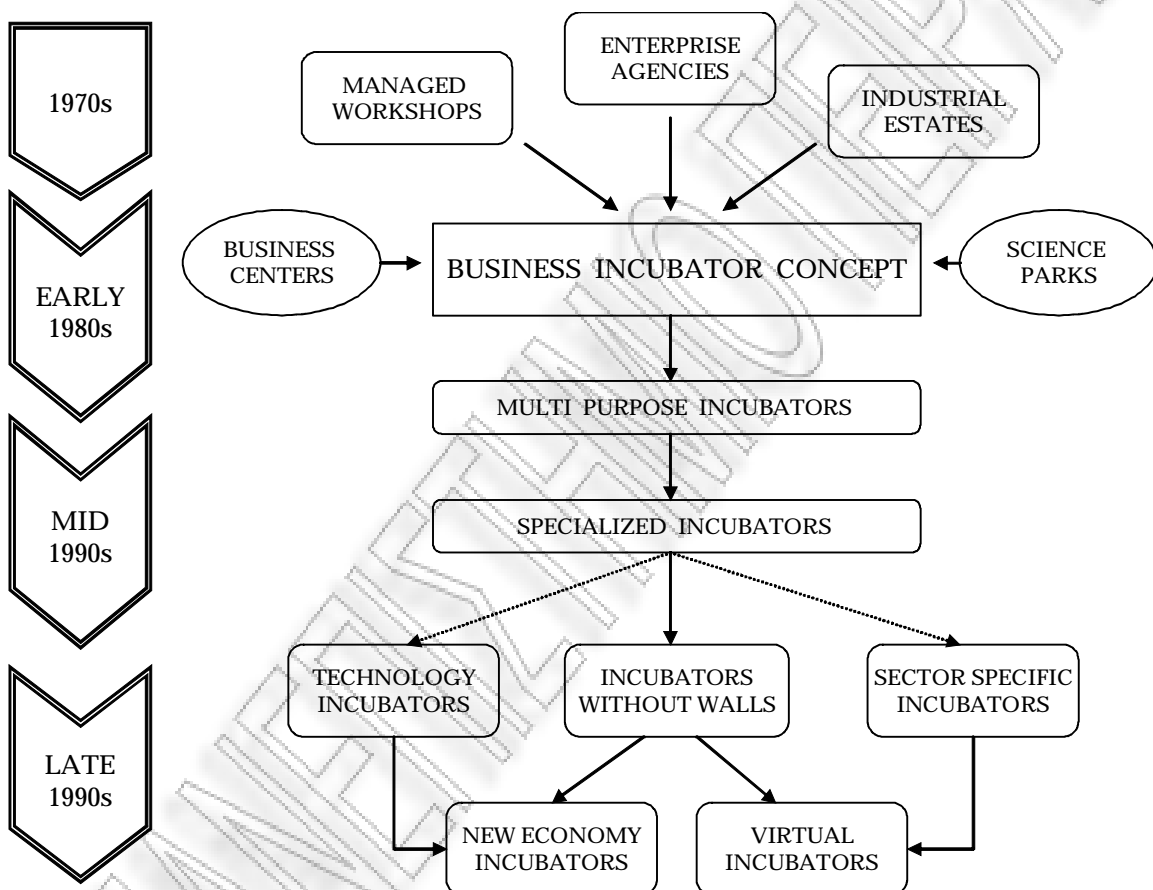
A number of EU-wide networks have been established (many with the support of the European Commission). This includes EBN (European Business & Innovation Centre Network), “Gates to Growth”, and “Science Alliance”. Each of these networks focuses on supporting different types of incubators. There are also national associations, the largest being in France, Germany and UK. Recent CSES research estimates over 1,000 incubators in Europe although only a minority has all the features or is tech- focused. Several incubators have been established on a cross-border basis. A key priority is to support incubator developments in the 10 new EU member states.

2.3 THEORETICAL BACKGROUND

2.3.1 EVOLUTION OF THE INCUBATOR MODEL

In its generic sense, the term “business incubator” is often used to describe a wide range of organizations that in one way or another help entrepreneurs develop their ideas from inception through to commercialization and the launching of a new enterprise. A broad definition of the term embraces technology centers and science park incubators, business and innovation centers, organizations which have no single physical location and concentrate instead of managing a network of enterprise support services new economy incubators, and a variety of other models.

Figure 2: The Evolution of the Incubator Model



The origins of the term can be traced back to the Batavia Industrial Center, commonly known as the first U.S. business incubator, opened in Batavia, N.Y., in 1959. However, the concept of providing business assistance services to early-stage companies in shared facilities did not catch on with many communities until at least the late 1970s. At that time and especially in the beginning of the next decade, western industrialized countries, faced with a rapid rise in unemployment resulting from the collapse of

traditional industries, recognized the need for fresh strategies that would help to regenerate crisis sectors, regions and communities.

Strategies pursued in the 1980s were broadly characterized by a switch in emphasis from “top-down” approach relying on exogenous factors and involving public intervention to transfer surplus mobile capital and jobs from developed to underdeveloped or declining regions, to a “bottom-up” approach focusing on maximizing the indigenous potential for economic development. At the same time,¹⁰ business incubators began to be used as instruments to support innovation and technology transfer. Lalkaka sums up the evolution of the incubator concept as follows:

The ‘first generation’ incubators in the 1980s were essentially offering affordable space and shared facilities to carefully selected entrepreneurial groups. In the 1990s the need was recognized for supplementing the work space with counseling, skills enhancement and networking services to access professional support and seed capital, for tenants within the facility and affiliates outside. This has led to the ‘second generation’ incubator, although many in the developing countries are still stuck in the original mode. Starting in 1998, a new incubation model emerged in parallel. This is intended to mobilize ICT and provide a convergence of support, towards creating growth-potential, tech-based ventures.

The new economy model has of course not developed to the extent originally hoped. There are now thought to be around 3,000 business incubators of various types worldwide.

The rationale for publicly funded business incubators – as with other types of subsidized assistance to SMEs – lies ultimately in addressing market failures, i.e. gaps and deficiencies in the support structure available to smaller firms (lack of affordable, divisible work space, facilities, services, of access to finance, information and other resources, etc). These market failures stem from the relatively high costs and risks of providing services to SMEs compared with larger firms and the unwillingness of the private sector to assume these costs and risks given the often-modest returns. Other incubator models do not, however, have market failure as their rationale. Incubation, not only in the US, but also in Europe, often serves also as an important catalyser for the

¹⁰ Rustam Lalkaka ‘Best Practices in Business Incubation: Lessons (yet to be) Learnt’, Paper presented to Belgian Presidency’s international conference on business centers, Brussels, November 2001.

commercialization of research and technology and provides a “laboratory” of sorts to promote entrepreneurship.

2.3.2 INCUBATOR DEFINITIONS

At the 1998 Helsinki workshop, a business incubator was defined as:

A place where newly created firms are concentrated in a limited space. Its aim is to improve the chance of growth and rate of survival of these firms by providing them with a modular building with common facilities (telefax, computing facilities, etc.) As well as with managerial support and back up services. The main emphasis is on local development and job creation.¹¹

This definition dates back to 1990 and in light of developments since then arguably places too much emphasis on physical aspects of incubator operations. An alternative definition that highlights the other services offered by incubators is provided by the US National Business Incubation Association (NBIA):

Business incubation is a dynamic process of business enterprise development. Incubators nurture young firms, helping them to survive and grow during the start-up period when they are most vulnerable. Incubators provide hands-on management assistance, access to financing and orchestrated exposure to critical business or technical support services. They also offer entrepreneurial firms shared office services, access to equipment, flexible leases and expandable space — all under one roof.¹²

The definitions adopted by the UKBI and German ADT are similar. Whilst the provision of physical space for start-ups is again seen as a defining characteristic of incubators, equal emphasis is placed on other aspects including, in the case of the UKBI, entrepreneur training, mentoring and visibility which are not mentioned in the NBIA definition:

Business Incubation is a dynamic business development process. It is a term that covers a wide

¹¹ European Commission OJ C186 – 51/52 dd. 27, July 1990

¹² NBIA, Best Practice in Action: Guidelines for Implementing First Class Business Incubation Programs' (NBIA, 2001).

variety of processes, which help to reduce the failure rate of early stage companies and speed the growth of companies which have the potential to become substantial generators of employment and wealth. A business incubator is usually a property with small work units that provide an instructive and supportive environment to entrepreneurs at start-up and during the early stages of businesses. Incubators provide three main ingredients for growing successful businesses - an entrepreneurial and learning environment, ready access to mentors and investors, visibility in the marketplace.

In contrast, the definition used by ELAN in France does not mention the physical attributes of an incubator at all and instead puts the objectives of promoting new start-ups and helping existing firms to expand at the centre of its definition. A somewhat similar approach - with an emphasis on the 'output' side of the business incubation process rather than 'inputs' - is adopted by EBN. This goes further than immediate outputs and stresses the wider, territorially orientated mission of business incubators:

The European Community Business and Innovation Centers (EC BICs) -as they are officially known - are support organizations for innovative small and medium-sized businesses (SMEs) and entrepreneurs operating in the public interest, they are set up by the principal economic operators in an area or region, in order to offer a range of integrated guidance and support services for projects carried out by innovative SMEs, thereby contributing to regional and local development.¹³

Two main conclusions are drawn from this brief review of the various incubator definitions. Firstly, there is a considerable degree of overlap with the focused approach to SME promotion, and combination of incubator units and business support services being seen as what makes the incubator concept unique. Secondly, the differences, to the extent that they exist, lie in the varying emphasis placed on the importance of physical aspects as opposed to other business support services, and the business incubation process itself, as constituting the essence of the concept.

¹³ EBN, 1998

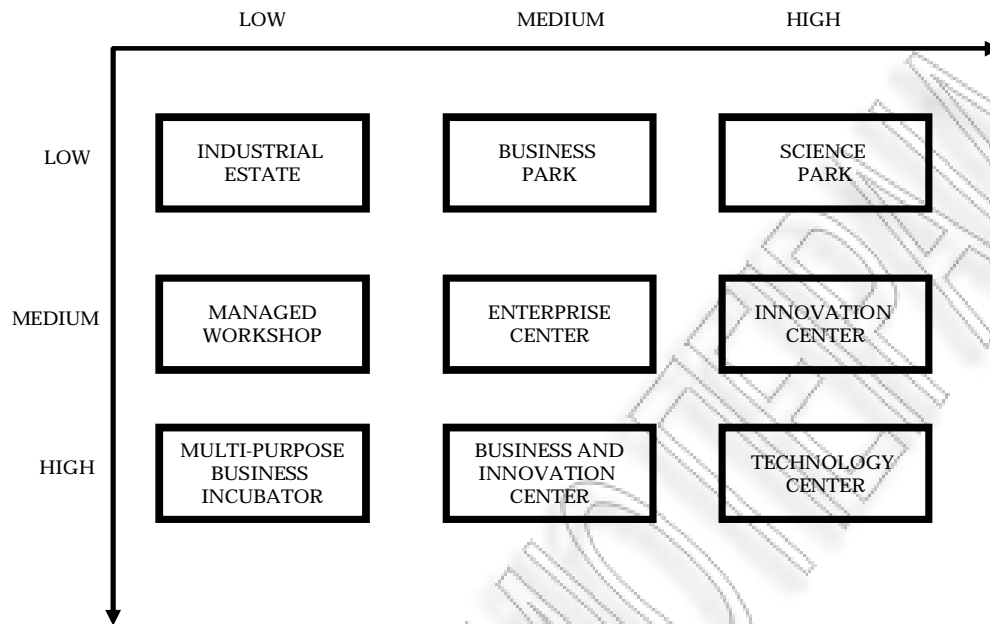
2.3.3 TYPES OF INCUBATORS

A great number of researchers provide the theoretical background and information about the different types of incubators. Nevertheless, there is not a definite approach in this differentiation, probably because of the multidimensional character of the concept of an incubator itself.

According to the National Business Incubation Association, there are three main types of incubators. NBIA statistics show that most incubators are mixed-use, meaning they serve a variety of industries. Then, there is another major category of technology incubators, which target clients in creating and commercializing new technologies. Generally, these two types of incubators aim to bring outside investments into a particular geographic area to expand the tax base. The third type, empowerment incubators, involves a smaller number of participants, but according to NBIA, it appears to be a fast-growing segment. These mixed-use facilities focus on clients considered underprivileged and underserved, such as minorities and women. Such empowerment incubators are often situated in economically distressed areas in hopes of revitalizing the regions.

The Center for Strategy and Evaluation Services makes a further distinction between incubators that have a public policy-driven enterprise promotion and/or regional development function and “new economy” incubators. These two types illustrate the diversity of business incubator models particularly well. Between the “traditional” regional development model and “new economy” incubators, there is an array of other types such as Business and Innovation Centers (BICs), technology centers, and innovation centers that all share basic incubator characteristics.

In the evaluation study: “Benchmarking Business Incubators”, (March 2002), of the Center for Strategy and Evaluation Services, there is a special matrix that illustrates the relationship between different incubator modalities and other SME promotion structures that include a physical space element.

Figure 3: The Typology of Incubators¹⁴

Business incubators are positioned towards the bottom right-hand corner of the matrix since they provide a high degree of management support to tenants and usually, although not always, cater for technology-based enterprises. There are of course alternative business incubator typologies but the approach outlined in Figure 3 provides a broad framework.

Industrial estates in the top left-hand corner generally have a non-selective intake, provide little or no management support and have no special criteria with regard to business activities and technology content. At the opposite extreme, in the bottom right-hand corner, technology centers have highly selective admission criteria, provide “hands-on” management support, and have a highly specialized technology focus.

¹⁴ Source: The European Commission Enterprise DG, Benchmarking of Business Incubators, February 2002

2.3.3.1 TRADITIONAL INCUBATORS

The primary goal of the traditional business incubators is to facilitate economic development by promoting entrepreneurship, innovation, employment opportunities and growth. For this reason, most of the incubators are operated directly by the national or local authorities but this doesn't exclude the specialized incubators that have been established by universities or private sector organizations. In Europe, the role of incubators in the promotion of entrepreneurship, employment and economic growth is widely acknowledged with the 2000-06 Structural Fund guidelines highlighting business incubators as a key instrument of EU regional policy.

In the USA, the "general service" type incubator is giving way to a more specialist approach and Technology Business Incubators or TBIs, (sometimes known as Technology Centers or Innovation Centers in Europe) have risen from accounting for under a quarter one-fourth to over one-third of total. In Europe, there has been a similar trend. There are also some interesting specialized incubators of a different, non-technology related sort. For example, a cross-border incubator has recently been established on the border between Germany and the Netherlands for companies seeking to trade in these two countries.

Over the past five years, there has also been a quite rapid growth in for-profit incubation systems, especially for accelerating the start and growth of ICT-enabled ventures. The Harvard Business School in its recent survey¹⁵ identified 356 such incubators around the world. Of these 222 are in the US, and the others include Canada (14), UK (28), China-Hong Kong (11), and Brazil (10). The growth of new economy incubators is reflected in the fact that whereas in 1994, only one out of every 25 technology incubator companies was IT related, by 1999, this figure had risen to 20. Sponsors include the quoted arms of established consultancies and technology solutions providers such as Bain & Co., Ernst & Young, HP and Dell and IBM; telecommunications companies such as Sprint PCS; and dot com start-ups such as cocoon, Gorilla Park, Ant Factory, Cartezia, and Internet-Incubation.

¹⁵ Hansen, Nohria, Berger, 'The State of the Incubator Market space, June 2000

A) TECHNOLOGICAL INCUBATORS (TBIs)

The word of technology means that the incubators have tenant criteria, which means it is restricted to high-tech start-ups. We could regard TBI as a system designed to close the gaps in the innovation process, and assist high-tech start-ups in the development of new firms. If 50 percent of an incubator's client base is "technology firms", it can be considered a technology incubator. By providing a variety of supports to start-ups and emerging firms, the incubators seek to combine entrepreneurial talent, technology, capital, know-how to leverage in order to accelerate the development of new firms, and of course in parallel with the benefit in the commercialization of technology to the market.

NBIA mentions that the technology-oriented incubators are increasingly locating near research parks, universities or research labs to offer "technopreneurs" access to a wider range of facilities, individuals and opportunities within their field. Tenant firms can have access to the research facilities and personnel of established firms, universities and research institutes. Additionally, they are able to network more easily with experienced and successful technopreneurs and may even engage in strategic alliances to exploit business opportunities as either a sub-contractor or a supplier.

Phillips. R.G (2002) defines at least three differences between TBIs and other incubators. First, the TBIs focus on technology-based firms. Second, they differ in supports offered. TBIs offer slightly different supports such as an access to advanced technology laboratories, equipment, and other research and technical resources such as faculty, staff, students, and libraries. The third difference is that TBIs are linked to universities or research institutions, which have a concern on technology transfer or commercialization. Among these three characteristics, the second characteristic is considered to give a different added value to start-ups. For example, the access to the high technology laboratories is very valuable and difficult to offer by some institutions except university or government research centers.

Phillips argues that one factor which gives an added value to new technology based firms by TBIs is a linkage to the university. Because the nature of technology, it seems logical that universities become important actors in the development of firms. Wiggins,

J. and Gibson. D.V (2002) from IC2 institute (Austin Technology Incubator) argue that the added value given by traditional university or community-based incubators becomes a vital differentiator between successful and unsuccessful incubators. It shows that in 2003, there are more than 800 business incubators in U.S. Most are non-profit and technology-oriented, characterized with an association to university. On other hand, there is a sharp decline of profit business incubators (without association to university) in the U.S.A.

B} BUSINESS INCUBATORS

Business incubators encourage the development of new businesses and foster local economic development. Incubators accelerate the successful development of entrepreneurial companies through an array of business support resources and services, developed or orchestrated by incubator management, and offered both in the incubator and through its network of contacts.

According to NBIA, an incubator's main goal is to produce successful firms that will leave the program financially viable and being able to operate independently. The success that comes out of incubators can be measured as positive economic development measures for society.

According to the study of the Center for Strategy and Evaluation Services, the term business incubator is used in order to describe the family of organizations embraced by the various definitions – the French “Pepinieres d'Entreprises”, German “Technologiezentren” and “Grunderzentren”, Business & Innovation Centers, and so on. An overall definition of this term might be as follows:

A business incubator is an organization that accelerates and systematizes the process of creating successful enterprises by providing them with a comprehensive and integrated range of support, including: Incubator space, business support services, and clustering and networking opportunities.

By providing their clients with services on a 'one-stop-shop' basis and enabling overheads to be reduced by sharing costs, business incubators significantly improve the survival and growth prospects of new start-ups.

A successful business incubator will generate a steady flow of new businesses with above average job and wealth creation potential. Differences in stakeholder objectives for incubators,

admission and exit criteria, the knowledge intensity of projects, and the precise configuration of facilities and services, will distinguish one type of business incubator from another.

C} ACADEMIC INCUBATORS

Much like other incubators, academic-affiliated programs have a variety of goals, including promoting economic development, commercializing new technologies, and enhancing universities' research missions. A study produced by NBIA highlights the advantages of incubator-university partnerships. Relationships between colleges and universities and business incubation programs follow three basic models:

- University-run incubation programs, which may be operated as a division within the school itself or as a separate entity under the school's jurisdiction;
- Incubators with formal partnerships with colleges or universities; and
- Incubation programs with informal relationships with colleges or universities.

It is apparent that incubators have a greater impact on the economy when they maintain ties with the university because of the impact on three important groups — entrepreneurs, students, and universities:

- Academic-affiliated incubators provide entrepreneurs with well-equipped laboratories, extensive libraries, powerful computer systems, technology expertise, a well-educated workforce, and subject-matter experts from the faculty;
- Academic-affiliated incubators provide students with internship or part-time job opportunities, real-world examples for case studies or class projects, opportunities to apply their knowledge to real business problems, and an introduction to entrepreneurship early in their professional careers; and
- Academic-affiliated incubators provide colleges and universities with opportunities to strengthen ties between the educational institution and the local business community, a system for bringing technological advances and products to the market, a recruiting tool for faculty members and students interested in entrepreneurial opportunities, an opportunity to fulfill research academic, and community service missions.

2.3.3.2 NEW ECONOMY (VIRTUAL) INCUBATORS

“New economy” type business incubators are often primarily virtual. New economy incubators are usually funded by venture capital companies or set up by large multidisciplinary consultancies that are able to offer a complete range of technological, advisory and other business support services to their clients. Large multinationals have also been keen to capitalize on their expertise in the e-economy, namely the rapid development of the B2B and B2C sectors, e-commerce, m-commerce (mobile phone commerce driven by WAP technology) and v-commerce (voice activated commerce) by offering advisory expertise to new high-tech start-ups within a virtual incubator model. The strategic objectives of the new economy incubators differ fundamentally from their traditional equivalents. First, new economy incubators are private sector, profit-driven with the pay-back coming from investment in companies rather than from rental income. Secondly, they tend to focus mainly on high-tech and internet-related activities and unlike traditional incubators, do not have job creation as their principal aim. Thirdly, new economy incubators often have an essentially virtual presence with financial and business services at the core of the offering unlike their traditional counterparts that usually centre on the provision of physical workspace.

The sharp decline of dot-com companies since mid-2000 has resulted in of the Internet-focused model, especially in the USA. According to Lalkaka ¹⁶:

In the 1999 – 2000 period, some 400 for-profit, Internet incubators were added in the U.S and elsewhere, due to the expanding opportunities that the Internet seemed to offer and due in part to unrealistic expectations. Typically, this model provides a smart workspace, focused consulting services to a small growth-potential group of firms, takes equity in the companies through an affiliated venture capital facility, and accelerates them to the market. The bulk of these incubators -- once considered the paradigm of best practice -- have closed down. Nevertheless, the equity-based, networked model has taught some lessons and continues to have relevance.

Lessons to be learnt are that the high market capitalizations given to new economy firms

¹⁶Rustam Lalkaka ‘Best Practices in Business Incubation: Lessons (yet to be) Learnt’, Paper presented to Belgian Presidency’s international conference on business centers, Brussels, November 2001.

meant that businesses could derive significant value by spinning off or ring-fencing non-core innovative ideas and concepts into separate businesses, nurtured them in an incubator-type environment. Likewise, new economy incubators offered an ideal environment for the nurturing of ICT-based start-ups. The recent stock market corrections have made this particular business model far less attractive, in the near future at least.

Nevertheless, there have been some positive and more wide-ranging consequences. In the period between mid-1998 and mid-1999, the media came to understand the concept of incubation for the first time. Venture capitalists could capture the attention of the press in ways that few non-profit organisations could. This attention led to increased development of both for-profit and not-for-profit incubators and the subsequent creation of many new companies.

In many respects, the term traditional and new economy incubators are not appropriate categories to use, given the brief success of the latter model and its inherent flaws as a business model. Alternative classifications such as technology centers, science park incubators, business and innovation centers, are also far from perfect since, despite different names, their basic functions are often very similar. Perhaps a better way therefore of differentiating between organizations that all share basic incubator characteristics is to identify those that are for-profit from those that are not.

The ultimate purpose of comparisons is to highlight the fact that the development of a benchmarking framework needs to be sensitive to the diversity of incubator models and operations, and the traditional-new economy models illustrate this diversity particularly well.

2.3.3.3 PRE-INCUBATORS

The new and innovative feature of pre-incubation is that the academic community can already test a business idea and gain business experience without having an own company. In contrast to a usual business incubator, the pre-incubator supports only entrepreneurial projects (“profit-centers”) and not already registered enterprises. The pre-incubator management and the academic conclude a contract, which enables the

profit-centers to carry out usual business transactions, e.g. a sale of pilot products, on behalf of the pre-incubator.

As the chief executive manager controls all business transactions of the profit centers, the financial risks are reduced for the academic or the entrepreneurial team. The act of registration of an enterprise usually takes place after a successful period of pre-incubation when academics or their entrepreneurial teams have gained sufficient knowledge, skills and experience to run a company on their own. Due to the self confidence and experience the academics gain during the phase of pre-incubation, their fears of failure are significantly reduced.

In the institutes of higher education, the gap between university level entrepreneurship studies and business incubation was discovered in the late 1990s. The gap consisted of financial risks, lack of capital, lack of knowledge and skills, unawareness of the value of the intellectual property, unknown market potential, and risk aversion. That explains the way that a pre-phase for the business incubators was seen as a necessity¹⁷.

According to USINE, first European pre-incubator was established at the University of Bielefeld in Germany in 1997. Thereafter, pre-incubation activities have spread their popularity rapidly and especially student-based pre-incubators have become widespread. For example, in Finland, incubation activities seem to be well established especially at the polytechnics (nowadays also called as Universities of Applied Sciences): 70 % of them co-operate with other incubators in organizing incubation activities. Every fifth polytechnic has its own business incubator and every second practice pre-incubation activities in their business incubator¹⁸.

The concept of pre-incubation has not yet been researched or defined comprehensively. First pre-incubators were designed to promote spin-offs and start-ups especially from and within the higher education institutes. Dickson¹⁹ defines pre-incubation as a “risk-reduced environment where entrepreneurial ideas can be tested for market viability before progressing into the business incubator”. Thereby, new innovations can be planned, tested and developed in pre-incubators before establishing a company, and

¹⁷ USINE 2005

¹⁸ Saurio 2003: 16–17

¹⁹ 2004: 15

participants are provided with the support needed for these²⁰. Pre-incubation allows cost reduction and diminishes disappointments of setting up a company²¹.

In higher education, pre-incubators are additionally understood as a part of the learning processes: they do not only prepare the students to start in the business incubator but also make the development of a business idea possible while still studying. Students are able to get the activities as an entrepreneur accepted as a part of their degree.

2.3.3.3.1 COMMON CHARACTERISTICS OF PRE-INCUBATORS

There are some characteristics common to pre-incubators:

- Offer services to potential entrepreneurs before establishing an enterprise,
- Provide risk mitigation strategy to both incubatee and incubator
- Have usually limited timeframe for incubatees and
- Constitute a part of the wider process of incubation. (Dickson 2004: 14.)

According to Rajaniemi (2005), the basic services of the pre-incubators are:

- Evaluation of business idea and know-how
- Business plan assistance (official documents, feasibility plan, analyses)
- Practical guidance (completing applications, connections to the authorities)
- Financial counseling (assistance in obtaining financial support, completing applications)
- Mentoring (by other companies, more experienced entrepreneurs, experts, senior students, “enterprise godfathers”)
- Office facilities (computer, telephone, fax, office, furniture)
- Trainings (lectures, seminars, workshops)
- Networks (existing network of the pre-incubator or business incubator)
- Academic credits as a part of the degree.

Services of the pre-incubation for the nascent entrepreneurs are often free of charge or of nominal costs. Usually only some of these services can be offered by pre-incubators themselves. Services can be externalized so that the expert services are bought from outside or that the training and counseling services are organized in the co-operation

²⁰ Dickson 2004: 14

²¹ USINE 2005

with the business incubator. Pre-incubator, contrary to the business incubator, do not necessitate actual pre-incubation facilities for its participants as the pre-incubation still concerns development of a business idea and plan, not already established businesses. Thereby, pre-incubators are able to save in their fixed expenditures.

Pre-incubators provide a “risk mitigation strategy” to both the incubation staff and the pre-incubated²² by having two tools in ensuring successful pre-incubation for their participants. On the one hand, participants are able to test the feasibility of the business idea and the markets of their products and services during the pre-incubation before taking the risk to establish their own company. On the other hand, a pre-incubator reduces the risk by selecting the participants and the business ideas with the greatest chance to succeed.

The time spent in the pre-incubation is limited and therefore often defined, according to Dickson as “probationary period”. Characteristics of this probationary period suggest that pre-incubation has a clearly defined beginning and ending. Entrance in the pre-incubation is normally sealed by a contract, which also works as a motivation for the participant actively to develop the business idea. Pre-incubation is usually ended when the pre-incubation time runs to an end or when a company is established. Pre-incubation time may vary from couple months to several years, depending on the concept of pre-incubation. According to Rajaniemi (2005), the average time for pre-incubation has been 3–6 months, but experiences have shown this period to be too short and the period is recommended to be extended to one year.

Pre-incubation is considered as a part of a wider process of incubation. According to Dickson, an assumed link exists between the enterprise education, pre-incubation and business incubation. The route from the pre-incubation to the business incubation is often promoted by offering tailored service packages for the nascent entrepreneurs, locating both incubators in the same facilities and organizing pre-incubation as a part of the already existing business incubation. Path from the institute of higher education to the pre-incubation is on the other hand supported by offering courses on

²² Dickson 2004: 14

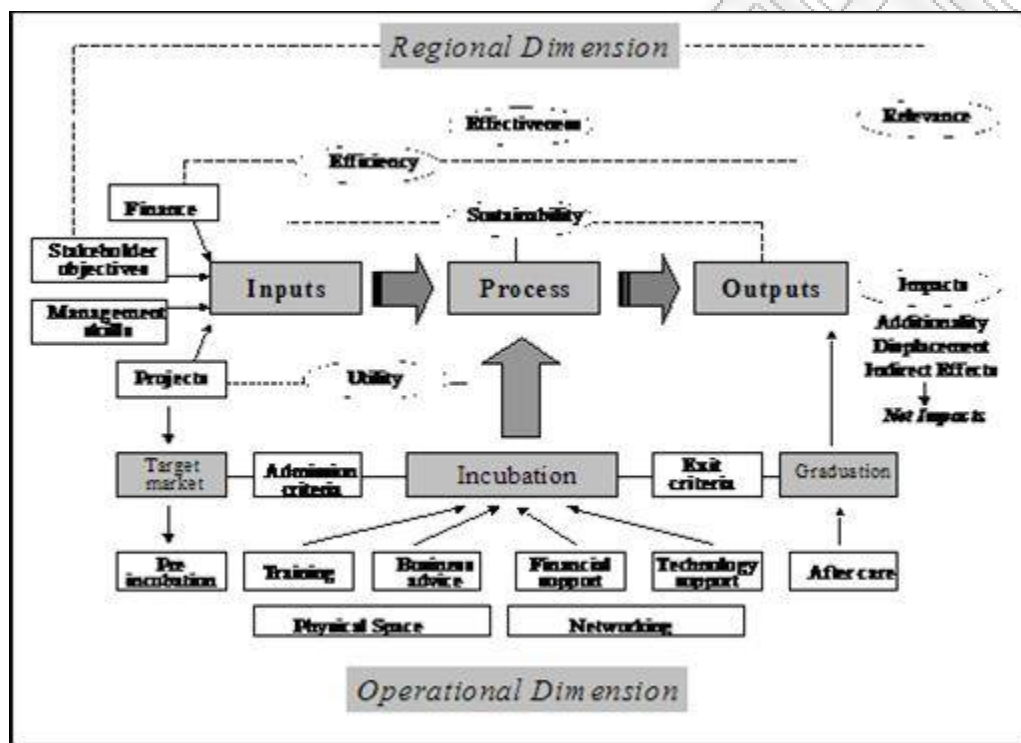
entrepreneurship (e.g. entrepreneurial paths), offering credits for the pre-incubation activities and integrating the business plan development into the degree programmes. Pre-incubators have an important role to play in stimulating entrepreneurial behavior in the higher education institutes. However, it should be noted that pre-incubators alone are not adequate facilities to promote entrepreneurship but entrepreneurial spirit should precede pre-incubation activities. From that perspective, pre-incubators should be seen as one phase in a rather long process of business development.

3RD PART: OPERATING PROCESSES

3.1 THE INCUBATION PROCESS

The most familiar model that describes the operation of incubators is that of the Center of Strategy and Evaluation Services, which depicts the whole incubation process in terms of a simple input-output model, as shown in figure 4:

Figure 4: The Input-Output Model



The figure above sets out the model in schematic form, combining the incubator input-output dimension, which is shown in the bottom half of the diagram, together with key best practice issues, which are shown in the top half of the diagram.

In particular:

- The inputs mainly consist of the contribution made by stakeholders, such as finance share, management resources, and projects put forward by entrepreneurs

- The various inputs are brought together in the business incubation process through the provision of incubator space and a variety of value-adding services to companies, a technique that is commonly known as the basic incubation process.

- The outputs consist in all the successful companies that graduate from the incubator with positive job and wealth creation impacts on local economies.

Taking the operational dimension, projects are identified that meet the criteria used to define the incubator's broad target market (e.g. projects with a particular technology focus). After a more detailed assessment, some entrepreneurs may be encouraged to go through a pre-incubation process, typically involving a combination of training and business planning, before they gain admission to the incubator.

According to CSES, the incubation process itself typically brings together three categories of business support services – training, advice on business issues, financial support -either from an incubator's own sources or from external providers, like financial institutions- and technology support. The provision of incubator units and networking, internally between tenants and externally with other organizations, like universities or large companies, constitute the other basic features of the 'package'.

A key feature of incubators is the limited duration of assistance with exit criteria typically specifying that firms should 'graduate' after a fixed period of time. Some firms will of course leave sooner if they grow rapidly and require more space than the incubator can provide. However, in many cases, contact will be retained with 'graduate' companies through the provision of after-care services and/or on-going networking.

As far as the key best practice issues are concerned, they are defined as follows:

Efficiency is regarded as the relationship between financial inputs and outcomes and, linked to this, value for money.

Effectiveness is linked to the extent to which the outcomes demonstrate that specific objectives are being achieved.

Relevance refers to the extent to which objectives and outcomes promote broader policy objectives.

Utility is connected to the extent to which services provided to client companies meet their needs.

Sustainability links with the durability of the outcomes being achieved.

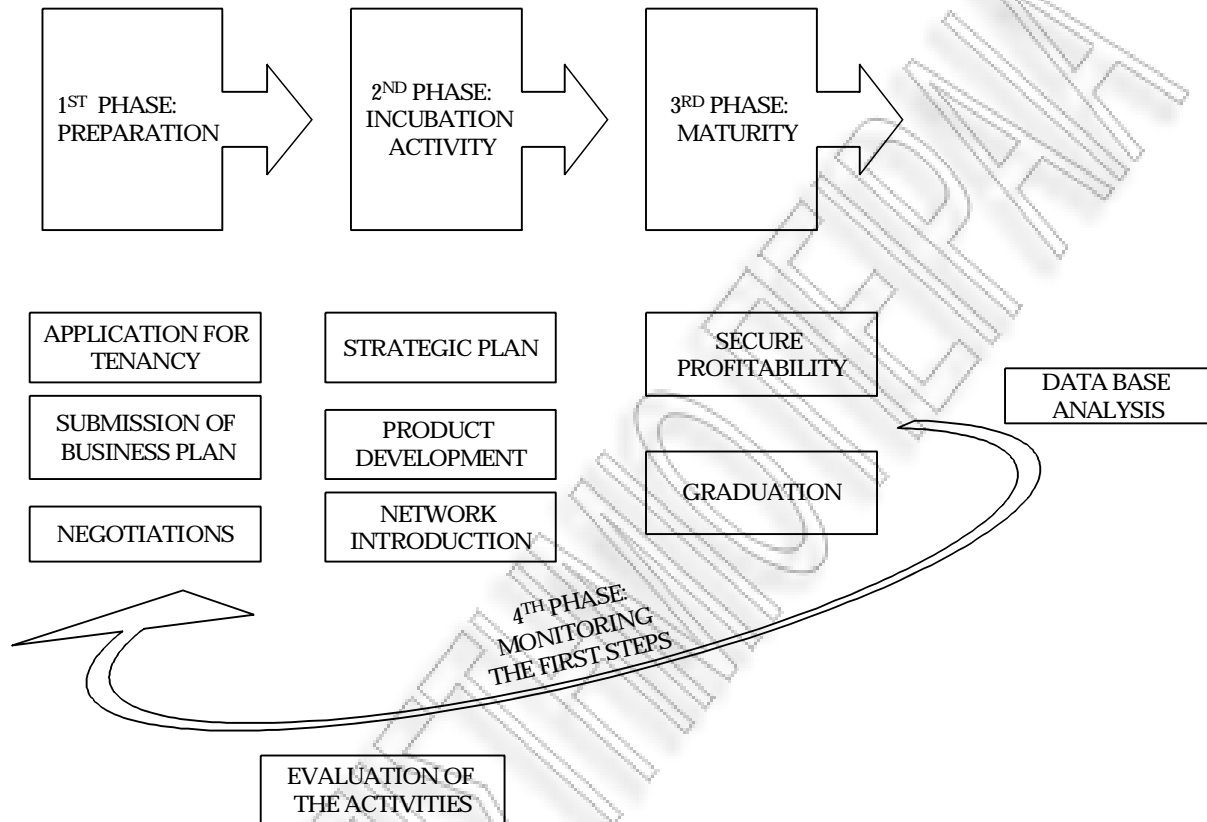
3.2 AN INTEGRATED MODEL

In this section, an effort will be made to best describe the whole incubation process, and all the different stages from the point where an idea from the entrepreneurs is captured, until the time where a company has reached such a maturity level that ensures its viability in the market. After describing this procedure a special description will follow, that focuses on each separate phase of this process.

There are many different ways to describe the process that incubators function. Various stage models have been developed by researchers, in order to explain the incubation procedure. In general, there are minimally three stages and maximally eleven, but they all have similar stages. The common procedure is that once the idea is formed, entrepreneurs decide to join an incubator, and then the incubator starts to play its role by helping those small businesses to mature in terms of the market.

Therefore, we can identify four phases in this procedure. Each phase consists of different stages, ranging from the preparation of the business plan, to the monitoring of the first steps of each graduate company. The following figure sets out the integrated model in schematic form:

Figure 5: The Integrated Model



3.2.1 PHASE ONE : PREPARATION

This phase of the incubation process can also be called a preliminary phase, as it describes the procedures made by possible tenants to participate in an incubator, and the necessary actions of the incubator side to select future tenants. The importance of this face is crucial to achieving a successful incubation process. If the right innovative business proposals are selected, they will be commercially promoted in the market, causing a continual economic growth for both the incubator and the client. The preparation phase consists of 3 stages. The application for tenancy and thus the idea evaluation, the submission of the business plan and closing, the negotiations of entrance.

❖ STAGE 1-IDEA EVALUATION

Companies that are interest in locating in a business incubator, usually complete an application for admittance. This application provides the incubator a first description of the embryonic business idea, and marks the essential information about this entrepreneurial idea, and information concerning the future tenant (person or company).

The next step of this stage includes interviews, where the prospective tenant meets with the incubator management team. During this interview, the future tenants make an informal description of their R&D program goals, and their proposed business milestones. This description may be in the form of an executive summary.

This is when the first agreement between the two parts is made; the submission of a business plan in order to evaluate the technical and commercial feasibility of the proposal. The manager of the incubator will assist the applicant in determining what information is required and what an acceptable business and technology feasibility plan is at this stage.

❖ STAGE 2- SUBMISSION OF BUSINESS PLAN

- Provide a description of the business proposition, the range of products and services.
- Describe the significant problem that the tenant's business addresses.
- Describe the key differentiating factors of the tenant's business that will allow it to gain, sustain and grow a market position.
- Describe the revenue model for the business. Provide details of the primary revenue source and mention others if appropriate.
- Describe the market, the purchase decision makers in the market, the sales and distribution channel(s), and the sales cycle. The tenant must ensure that the information is specific to the business opportunity and not a generalization of the industry.
- What is the size of the specific market and how much can the tenant expect to capture annually over the next few years.

-The tenant must describe the alternative products and suppliers that offer customers a solution and how this is superior to the competition.

-Describe the major milestones and challenges for developing the business.

-Describe the principle participants in the business and the positions that need to be filled, such as the specific strengths and resources does the team of the company bring to the opportunity, and the factors that make the tenant unique.

-The tenant must describe what is needed to meet the business objectives. What resources are required from others, what metrics will affect the ability to sustain rapid growth and profitability (i.e. technology infrastructure or other scalable resources).

-Financial may include:

- Business balance sheet
- Historical profit and loss information for last 2-3 years (if applicable)
- Cash flow projections for 1 to 3 years
- Sources of working capital for at least the first 6 months in the incubator
- Estimate of future funding requirements
- Personal Financial Statements from principals who own 20% or more

❖ STAGE 3- NEGOTIATIONS

After satisfactory completion of the technical and business plan review, the prospective tenant will work with the manager of the incubator to determine the prospective client's space and facility requirements. The manager and the prospect tenant will negotiate the type of agreement (e.g. lease, services, licence fees) to be signed between the parties.

The parties will also discuss the goals for the business and how the incubator can best assist the business in achieving those goals. There will be a review of the company's technology, management team, industry climate, and competitive elements as well as an examination of the financial stability of the company.

3.2.2 PHASE 2: INCUBATION ACTIVITY

The second phase considers being the core of the incubation process. It includes 3 stages concerning the setting of goals, the commercial activity of the product and the introduction to the market :

❖ STAGE 1- STRATEGIC PLAN

This stage includes the setting of goals and objectives for the tenants in order to move the company to a benchmark level. The incubator management team along with the client, develop a strategic plan where vital information for the prosperity of the company are guided. This type of information involves timeline, specific strategies, incubator resources or facilities to be utilized as well as evaluation models.

❖ STAGE 2- PRODUCT DEVELOPMENT

During this stage, the main incubation process is being conducted where actual products that will be delivered to the customer are developed. This stage also includes the design, documentation and operation of the business's activities as a professional legal entity.

❖ STAGE 3- INTRODUCTION TO THE NETWORK

One of the most important contributions of incubators is their catalytic role to external sources of support, which is the introduction of the client with an incubator's network. Incubator networking is important as it gives clients access to a wide range of services, business support, skills, markets and customers, and financing sources. Networks might include banks, business angels or networks, venture capitalists, customer-based networks, competitors, local authorities, higher education establishments, other national and international incubators, and sector-based networks.

In addition, as far as the internal network is concerned, incubation managers also create opportunities in this stage for their clients to network with each other. Some clients may be doing business with each other, but the emotional support that incubatees can give one another by sharing the ups and downs of starting and growing a new venture is equally essential.

Internal networking can be stimulated by organizing informal gatherings regularly to introduce new tenants, organizing seminars, by setting up networking areas within the incubator and by creating client directories.

At this stage, tenant companies aim at realizing their first sales in order to validate their product's value proposition, to identify areas for refinement and deliver early cash flow, conditions that secure their profitability.

3.2.3 PHASE 3: MATURITY

This phase of the incubation process consists of two stages; the company's viability and the graduation stage. As the company reaches its maturity, thus becoming independent and self-reliant, seeks to graduate from the incubator's programme and facilities. This is an important period for every young company and therefore will be monitored carefully by the incubator. Incubators usually operate networks of former incubator's companies that are very helpful to both past and present tenant.

❖ STAGE 1 -SECURE PROFITABILITY

The first stage of the second phase is a vital evidence of a company's success. After making its first sales, new challenges will arise within the firm, concerning operation and financial management. The company during this stage usually identifies financing requirements in advance of actual needs in order to ensure that negotiations will be held from a position of strength, and approaches larger funds like Venture Capital firms.

❖ STAGE 2- GRADUATION

In this stage before graduation, the incubator usually applies some key factors that certificate the ability of the clients to continue on their own:

- Client no longer needs or uses incubator business assistance services
- Client has experienced significant revenue growth and profitability and has achieved agreed-upon milestones
- Client's space requirements exceed available space in incubator
- Business reaches maximum allowable stay
- Client exceeds a set number of employees
- Business assistance needs of client are beyond what incubator can provide
- Client company has an experienced independent management team
- Client is acquired by another company
- Client company has had a liquidity event or attracted additional financing
- Client, if a corporation, makes a public offering of its stock

3.2.4 PHASE 4: MONITORING THE FIRST STEPS

This phase consists of two stages; the data base analysis and the evaluation of the incubator activities.

STAGE 1- DATA ANALYSIS

During this stage, the incubator management team accumulates financial and marketing information concerning the graduate tenants, in order to keep a record of their entrepreneurial course. In addition, special annual or semi-annual reports and analysis are made so as to monitor each graduate progress that will eventually help the incubator reorganize or develop its facilities and services.

STAGE 2- EVALUATION

The second stage provides the incubator with possible suggestions and resolutions for its possible weaknesses. Through the data analysis of the previous stage, the incubator management team, can assess the growth of each graduate company in relation to the effectiveness of the incubator, and thus suggest different approaches to future tenants.

3.3 INCUBATOR SPONSORS

Most of business incubators rely on varying degrees of support from a range of sponsors including EC, state and local government, universities and research institutes, private sector and regional development agencies. According to National Business Incubation Association (NBIA):

“Incubator sponsors are organizations or individuals who support an incubation program financially. They may serve as an incubator’s parent or host organization or may simply make financial contributions to the incubator”.

Sponsors of incubator facilities are quite diverse and their objectives may often differ. Private sector sponsors, such as corporations and investor groups, are primarily interested in property development, transferring innovative technology, and investment opportunities in tenant firms. Public sector sponsors, such as nonprofit development organizations and local governments, are primarily interested in job creation and economic growth. Education sector organizations, such as universities and research institutes are primarily interested in training opportunities for students and commercial outlets for faculty research. To achieve these different objectives, sponsoring groups pursue different management policies. Although these sponsor objectives and therefore the management orientations may differ, the universal purpose of an incubator is to increase the chances of a firm in surviving its formative years.

Business incubators are more likely to succeed if they are supported by a broadly-based partnership of public and private sector sponsors. In particular, the capacity to leverage private sector inputs, whether this is in the form of finance or other types of support (e.g. expertise, access to facilities, corporate venturing) is critical. However, it is widely recognized that in the early developmental phase, public funding is vital because it can often take a number of years before a business incubator can attract private sector funding and/or generate sufficient income from other sources (e.g. rent) to cover operating costs.

According to the project “Benchmarking of Business Incubators” undertaken for the European Commission by the Center for Strategy & Evaluation Services (CSES), an analysis of incubator sponsors or stakeholders is provided in the following table:

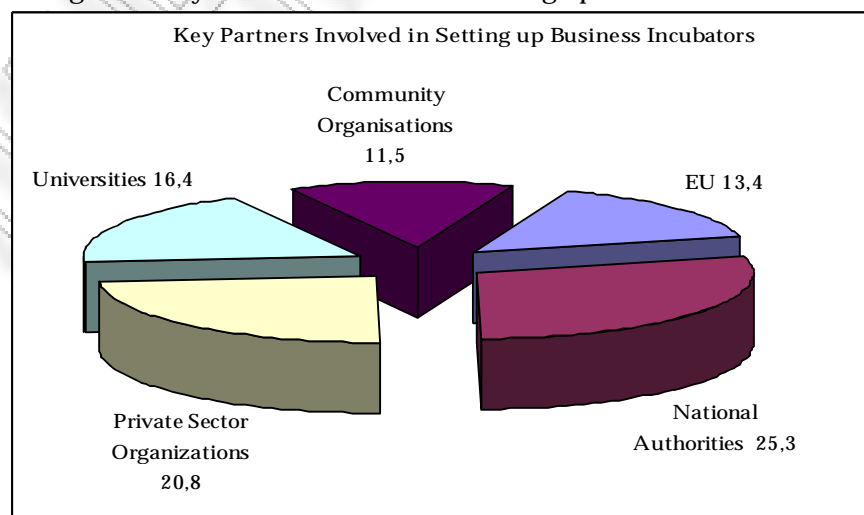
Table 1: Key Partners Involved in Setting up Business Incubators

PARTNERS (Board Members and other Partners)	NUMBER	PERCENTAGE
(1) EU and/or other international agencies	36	13.4
(2) National authorities and public agencies	68	25.3
(3) Companies, banks and other private sector organizations	56	20.8
(4) Universities and other R&D organizations	44	16.4
(5) Community and voluntary organizations	34	11.5
TOTAL	269	100.0

Source: CSES analysis of sample, multiple responses possible

As we can see, public authorities are generally the major shareholders in most incubators established in EU countries but private sector organizations also play an important role. The typical partnership structure of new-economy incubators is obviously more oriented towards the private sector, and largely dominated by companies, banks and other private sector organizations. However, the rapid rise and fall of Internet incubators since 1999 have spurred a convergence of for-profit and not-for-profit incubators toward public-private partnerships. Initially the unrestrained media coverage and investor enthusiasm about Internet incubators put pressure on traditional incubators to adapt similar business models and practices in order to attract private capital. Since then, the withdrawal of investors from Internet-related ventures and the general market decline have compelled many private incubators to seek out more secure and stable means of support from public authorities and institutions.

Figure 6: Key Partners Involved in Setting up Business Incubators



The next table provides an analysis of the legal status of business incubators. Most are incorporated as public companies limited by guarantee or shares.

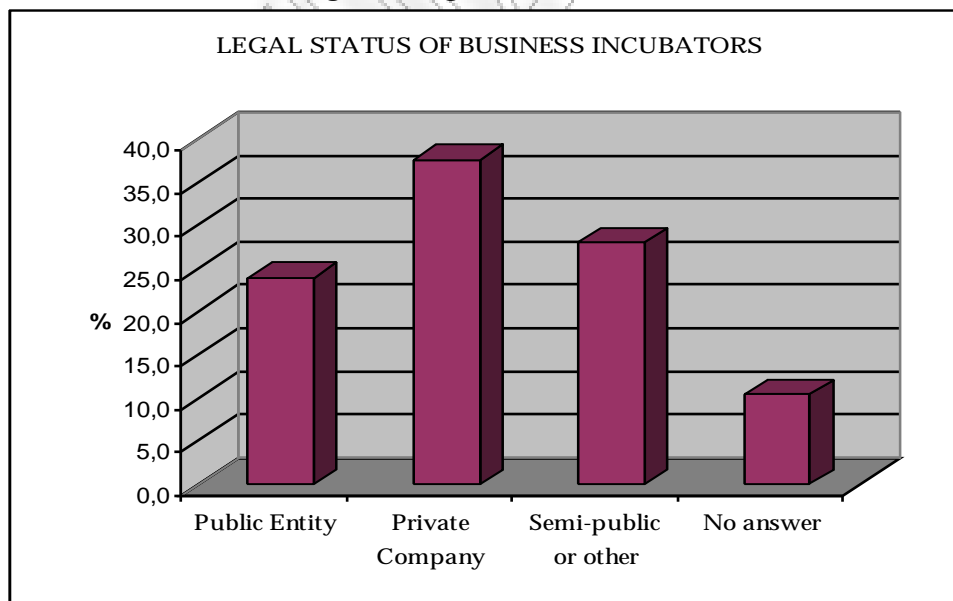
Table 2: Legal Status of Business Incubators

LEGAL STATUS OF INCUBATORS	NUMBER	PERCENTAGE
Public Entity	30	24.0
Private Company	47	37.6
Semi-public or other	35	28.0
No answer	13	10.4
TOTAL	125	100.0

Source: CSES analysis of sample

The number and type of organizations making up business incubator partnerships varies from relatively small groups (e.g. UK) to partnerships consisting of up to twenty organizations (e.g. Portugal). Incubator managers stressed the leadership role of public authorities and the importance of a consensus amongst partners over business incubator objectives. Dublin BIC in Ireland is a very good example of a formal public private sector partnership (PPP) that has been used to raise funding for the initial capital investment costs of establishing the incubator.

Figure 7: Legal Status of Business Incubators



3.3.1 EACH SPONSOR'S OBJECTIVES

Although each sponsor acts according to its own scope, they all support the following goals:

- Reaching higher employment levels
- Creating a dynamic business environment
- Stimulating the further development of entrepreneurial skills
- Stimulating the local/regional development

In order to see how the different sponsors' objectives are affiliated with the goals of an incubator, we should mention separately each sponsor's purpose:

❖ European Union

As far as the European Community is concerned, its goals are clearly orientated in achieving a higher level of employment. This issue is one of the key concerns of the Member States, given its high average level in the European Union with unemployment currently being around 7.7%.

Following on from the 1993 White Paper on Growth, Competitiveness and Employment, the Essen European Council (9 and 10 December 1994) identified five priority areas for action to promote employment:

- Improving employment opportunities by promoting investment in vocational training;
- Increasing the employment-intensiveness of growth;
- Reducing non-wage labor costs;
- Increasing the effectiveness of labor-market policies;
- Improving help for groups that are hit particularly hard by unemployment.

By supporting business development, incubators implicitly promote a positive development in entrepreneurial culture and an increase in employment levels.

❖ National and local government

State, regional and local governments are all concerned with employment issues and economical development. These governments are primarily focused on activities and possibilities in "their own area". Boundaries of "economic areas" usually do not coincide

completely with formal geographical boundaries. This means that governments have to work in close harmony with each other on local, regional and national level as well. The wider goals of national governments are usually accomplished by developing their policies and set their aims nationally. But in almost every country there are examples of national governments paying additional attention to regions that are in need of additional support. For instance, when it became clear that the economic development of the Northern part of the Netherlands was getting more and more behind in comparison with the rest of the country, an additional financial input - the so called 'Langman money' was offered.

Governments in general have a good reason to be interested in the existence of business incubators. Suggestively it can be mentioned that the average public cost for the creation of a new job in an incubator setting amounts to only € 4.000, and that about 850 European business incubators assist in the creation of 26.000 sustainable jobs per year. The support by national governments comes in different ways. Although legislation is an important tool, one cannot expect that just creating new legislation would solve all the problems, if any at all. Therefore, national governments create additional funding. Regional Development Agencies, B.I.C.'s, Chambers of Commerce etc. are being used to bring that extra money 'to the market'. These funds are partly spent on the infrastructure and partly spent as subsidies to strengthen and develop private companies.

As regional and local governments are operating on a smaller scale than national governments, local and regional issues are more emphasized. Additionally, in contrast to national government, regional and local governments are more competitive.

❖ Universities and research institutes

Universities and research institutes invest vast amounts of time and money in the research of new technologies with market potentials. The commercialization of newly developed technologies is neither the core business of universities nor of research institutes. Therefore, the cooperation of those institutions with incubator centers is of eminent importance. Incubators can help universities to realize research spin offs, by the exploitation of new interesting technologies with market potential. Taking technological

findings 'out of the lab' and into the real world will usually result in content related feedback to university and research institutes, thus posing new challenges.

Moreover, the cooperation with incubators also contributes to helping postgraduates in finding work.

❖ Regional development agencies

Regional development agencies usually provide money where regular banks, due to a lack of securities, are not interested. The goals of regional development agencies are different from 'normal banking'. The creation of jobs in the region may be a more important goal than just making profit. That explains why in many cases, a part of the risks regional development agencies encounter is covered by the state.

Regional development agencies, although partly competitor as far as seed funding might be the case, do benefit from cooperation with incubators. On the other hand, cooperation with regional development agencies is also profitable for the incubator. Third party money helps to spread and share the risks and leaves room for other investments. Regional development agencies often are involved in the merger of starting or underperforming businesses, if a combination of those businesses promises to be successful. As incubators are constantly involved in creating and supporting new companies as well as in mergers of those companies, the cooperation between incubators and regional development agencies is a logical consequence.

3.3.2. EACH SPONSOR'S OBJECTIVES AND INCUBATORS

The predilections of the leading sponsors influence the incubation goals. For instance:

Table 3: Incubator Sponsors and Desired Goals

SPONSOR	DESIRED GOALS
Technical university	Innovation, faculty/graduate student involvement
Research institute	Research commercialization
Public/private partnership	Investment, employment, other social goods
State sponsorship	Regional development, poverty alleviation, equity
Private sector initiative	Profit, patents, spin-offs, equity in client, image
Venture capital-based	Winning enterprises, high portfolio returns.

Further, multiple sponsors bring a variety of concerns, strengths and conflicting goals. All hope to benefit by the image of a successful program, and in turn bring credibility to the incubator clients.

Being a start-up business to serve start-ups, the incubator itself must mimic the dynamism of entrepreneurial ventures, with the prospect of becoming self-reliant within say 5 years of operations. However, the majority in both developed and developing countries operate on a non-profit basis and with economic development goals, deriving their income mainly from rentals and some from services, supplemented by state subsidies (referred to euphemistically as 'infrastructure investment' or 'venture socialism'). Some may take equity in the client companies, say at rate of 1% a year of residence.

That being said, each incubator is different from another, and the above characteristics may vary in degree of pertinence. Importantly, all incubators - traditional and tech-based - should concentrate on providing the software of value-adding counseling, training, information and networking services, as well as the hardware of affordable workspace and shared office facilities. In situations where market failures are in the access to affordable workspace and support services, the convergence provided in an incubator could be the preferred system.

3.4 INCUBATOR OBJECTIVES

After mentioning the different sponsors' objectives, it would be useful to appose the objectives of an incubator itself. In general, they aim at the creation of employment, by commercialization of new technologies and the improvement of the entrepreneurial culture and therefore improve economic and social development.

As the following table shows, contributing to the competitiveness of local economies and job creation ranks as the principal objective of most incubators. Other objectives are ranked more or less equally:

Table 4: Business Incubator Objectives

INCUBATOR OBJECTIVES	RANKING (1=most important)						
	1	2	3	4	5	0	Average
(1) Contribute to competitiveness and job creation	56	14	4	0	1	3	1.3
(2) Help R&D centers commercialize know-how	10	18	19	18	3	9	2.8
(3) Help companies generate spin-off activities	3	23	27	12	5	7	2.9
(4) Help disadvantaged communities/individual	1	12	12	22	15	16	2.8
(5) Other roles	7	6	7	7	6	44	2.9

Source: CSES analysis of sample

Amongst technology incubators, a key factor is the extent to which an incubator plays an active role in the broader regional (technology) development strategy of the area where it is based. Obviously, for new-economy incubators this table would look quite different, the primary objective being the wealth of their own shareholders. When this objective eventually turned out to be more difficult if not impossible to attain, some incubators resorted to selling consulting services to established companies, or to collaborating with local universities and research institutes.

It would be useful to look into incubators general objectives, in terms of economic, technological and real estate development:

❖ Economic and social development

Incubators promote the creation of new firms, which in turn create new jobs, thus increasing employment.

As mentioned above, especially governmental institutions (EC, state, region, local) are primarily interested in economic development. This interest is often focused on a specific region. Regions that are trailing behind receive extra support to close the gap.

Job creation leads to economic and social development of certain areas. This is the main objective when government agencies are behind the creation of incubators. This can be well observed in the case of India or China where governments initiated and supported the creation of science parks and incubators for the past 10 years.

❖ Technology commercialization

Incubators provide an environment that should promote commercialization in the form of spin-offs from universities or other research centers.

The incubator should support new companies in accessing the market. This requires active support on sales and marketing. This support can be offered by the incubator management as well as by external specialized service providers.

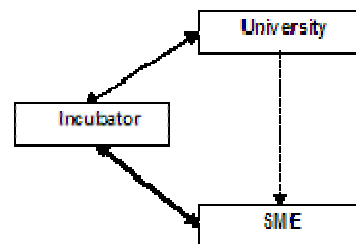
❖ Entrepreneurship

Business incubators are found all over the world. The model has been effective for decades in the USA and Western Europe where they can be found in the hundreds. Some are heavily sponsored by governmental agencies, others are completely self-supporting.

Links between Universities and SME's always existed, although less prominent and primarily based on personal relations. It is clear that those links, however useful, cannot offer the support the new entrepreneur needs. In this situation, knowledge flows down and some information finds its way back to the university. However, this kind of information exchange is usually content related, having hardly any effect on specific entrepreneurial skills.

Incubators offer more than just to fill this information gap. If needed, the new entrepreneur has to be trained. Not in his field of technical expertise, but in that new field of being an entrepreneur. These new expertises may range from writing a business plan or developing a marketing strategy to human resource management. Incubators find their place between university and SME, as shown at the following figure:

Figure 8: An Incubator's place



An Incubator feeds the university with structured information about market developments. This information is gathered from all kinds of sources. These might be SME's, other incubators, marketing research etc.

The university can provide the incubator with knowledge, skilled graduates, scientific support etc. The university might also use the services of the incubator to take care of patents and associated legal support. The incubator also makes its own network relations available to university as well as to the SME, thus supporting the creation of synergy.

The same model is now being applied in Central and Eastern Europe where since “the change”, the amount of businesses is growing rapidly in an environment where economies have been previously dominated by large state owned companies.

Moreover, promoting and supporting entrepreneurship can be considered as a major goal.

3.4.1 INCUBATOR BENEFITS

For a well-managed incubator the benefits for each the participants can be many-fold:

- For tenants, it enhances the chances of survival by three- or four-fold as compared to a start-up outside the incubator, raises credibility, helps improve skills, creates synergy among client-firms, facilitates access to mentors, information, technology

and seed capital. One of the biggest benefits of being a part of an incubator is that insulates tenants from the word “environment”. The incubator tenants concentrate on getting their idea supported and establish the market network.

- For governments, the incubator helps overcome market failures, generates jobs, incomes and taxes, and becomes a demonstration of the political commitment to small businesses.
- For research institutes and universities, the incubator helps strengthen interactions between university-research-industry, promotes research commercialization, and gives opportunities for faculty/graduate students to better utilize their capabilities.
- For business, the incubator can develop opportunities for acquiring innovations, supply chain management and spin-offs, and helps them meet their social responsibilities.
- For the local community, an incubator creates self-esteem and an entrepreneurial culture, together with local incomes as a majority of graduating businesses stay within the area.
- For the international community, it generates opportunities of trade and technology transfer between client companies and their host incubators, a better understanding of business culture, and facilitated exchanges of experience through associations and alliances.

These are the desired outcomes, often only partly achieved due to poor management and other factors.

Emerging evidence, nevertheless, suggests that in many situations the benefits indicated above are realizable and out-weigh the net public subsidy. It should be noted that incubators nurture entrepreneurs, who create enterprises, of which some would create direct and indirect employment, after leaving the incubator, with incomes and assets that in turn contribute to sustainable economic growth. Often the start-up entrepreneurs' task may be to create jobs for themselves and conserve their limited funds; only when they graduate and leave the incubator, some may grow exponentially creating employment, incomes and taxes.

3.5 RANGE OF SERVICES

The nature and range of support services provided by a business incubator will vary depending on the model and the objectives of investors financing the incubator. However, business incubators generally seek to provide their clients with a comprehensive range of facilities and services with a full-service incubator offering a combination of incubator space, business support services and other assistance.

The following table provides an analysis of the types of business support services provided by incubators:

Table 5: Incubator Support Services

TYPE OF SERVICES	IN HOUSE		EXTERNAL	
	No	%	No	%
(1) Pre-incubation services	66	11.7	15	3.3
(2) Business planning and forming a company	62	11.0	25	5.5
(3) Training to develop business skills	36	6.4	47	10.3
(4) Accounting, legal and other related services	16	2.8	57	12.5
(5) Market research, sales and marketing	31	5.5	52	11.4
(6) Help with exporting and/or partner search abroad	28	5.0	42	9.2
(7) Help with e-business and other aspects of ICT	39	6.9	35	7.7
(8) Advice on development of new products and services	43	7.7	35	7.7
(9) Help with raising bank finance, grants, venture capital	68	12.1	28	6.1
(10) Incubator venture capital fund, business angel network	31	5.5	32	7.0
(11) Advice on recruitment of staff and personnel management	32	5.7	35	7.7
(12) Networking, e.g. with other entrepreneurs, customers	64	11.4	24	5.3
(13) Mentors, board members and other senior advisers	38	6.8	27	5.9
(14) Other services	8	1.4	3	0.7
Total/Percentage	562	100.0	457	100.0

Source: CSES Analysis of Survey Data: Based on 76 responses, multiple responses possible

The analysis suggests that the in-house services provided by incubators are pre-incubation, business planning, help in raising finance, and networking. A high proportion of incubators also provide training, accounting and marketing support but these more specialized services tend to be delivered using external providers. Far fewer incubators provide services such as access to in-house seed and venture capital funds, partner searches, help with human resources issues and recruitment, advice on ICT, and

mentoring support.

Most of the business incubator managers, agree that the quality of business support services, and not physical aspects, is the most critical aspect of the incubation operations. However, from a tenant perspective, the physical proximity to other tenants can play a beneficial role, both by catalyzing the entrepreneurial process and by facilitating networking, alliances and collaboration between firms. The physical incubator environment is clearly conducive to the cross-fertilization of ideas and networking. This finding applies equally to new-economy incubators, as confirmed by the Harvard Business School study which recommends, "Strategically investing in portfolio companies" to maximize the scope for collaboration and synergy.

According to the CSES, the incubator business support services can be subdivided into the following main categories - entrepreneurship training, business support services, technology and innovation support, and financing start-ups and expansions.

3.5.1 PRE-INCUBATION AND ENTREPRENEUR TRAINING

Pre-incubation is the term used to describe support services to would-be entrepreneurs before they launch their business. These services can include proactive identification of would-be entrepreneurs, helping them to develop a business plan, training and advice on forming a company. The emphasis on pre-incubation varies considerably with some incubators operating programmes but most not doing so.

Where pre-incubation services are provided, entrepreneurs will typically be offered desk space and other basic support (e.g. computer and telephone) for a period of time during which they will be expected to prepare a business plan. In some cases²³, this process

²³ This includes the Entrepreneurship Development Programme (EDP) run by the Centre for Innovation and Entrepreneurship (CEI), part of Linköping University, in conjunction with the Mjardevi Science Park (Sweden). CEEI Valencia in Spain is helping to develop entrepreneurship skills more widely in the region as well as just providing services to the incubator tenants. This includes monthly courses on setting up and developing new businesses and workshops for existing entrepreneurs on various business topics. BIC Liguria in Italy has launched a similar initiative specifically for young people involving promotional seminars at the University of Genova in conjunction with a major regional bank. Similarly, in Finland the

forms part of courses operated by business schools or universities with incubator selection procedures being effectively being an integral part of course assessment arrangements. Elsewhere, pre-incubation activities are carried out 'on-site' in specially designated areas of the incubator.

Most incubators also provide entrepreneurs with advice and assistance with company registration procedures. According to another Enterprise DG study (Benchmarking the Administration of Business Start-Ups, 2001), the length of time required to complete these procedures, and their complexity, varies enormously across the EU. Whereas in some countries the legal formalities and other procedures are straightforward and a company can be formed in a few days or weeks, in other countries this can take months.

3.5.2 BUSINESS SUPPORT SERVICES

The types of business support services typically provided in-house by incubator management include business planning, advice on accessing capital, marketing, the identification of suitable business partners and general strategic advice.

Other types of business support services, such as specialist legal services, accounting and market research tend to be provided by specialist external providers with whom incubator management have established relationships. Clearly, business incubator management, many as experienced former businesspeople in their own right, have a critical role to play in supporting and nurturing early-stage businesses through the provision of high- quality business support services.

Employment and Economic Development Centre, a nationwide business support organization, works closely with a regional network of business incubators to provide early-stage pre- incubation services to prospective incubator tenants and help ground potential entrepreneurs in the rudiments of operating their own businesses. In France, Bordeaux Productic has made special provision to permanently set aside incubator space for prospective tenants to elaborate on their business plan. Incubator management provides specialist pre- incubation business counseling and advice to help entrepreneurs go through the conceptualization process and set up in business. In Spain, the BIC in Valencia runs a comprehensive training programme, both inside and outside the BIC.

Evidence²⁴ from the case study and survey work of the Center for Strategy and Evaluation Services, suggests that business support services provided by incubator management can help bridge the traditional market failure in the provision of business support services to the small business market. Many of the larger private sector business support organizations and management consultancies do not get involved in the SME market.

3.5.3 TECHNOLOGY AND INNOVATION

The objectives of incubators will vary, and some, in particular, science park based incubators, will concentrate on selecting and assisting entrepreneurs who have particular technological or innovative schemes. These incubators will provide a basis for technology transfer. The objectives of these incubators are different from those, which seek to increase employment through the promotion of more 'traditional' business activities with low technology content.

The role of incubators in this field is quite diverse: some, for example, provide access to centers of excellence (e.g. a university laboratory) whilst others have their own specialist resources. On a larger scale, there are examples²⁵ of incubators that are involved in a

²⁴ At Taguspark in Portugal, this is facilitated by a searchable on-line database, which can be accessed by tenants as well as potential users elsewhere in the region (the "Centre of Competence"). As good example of networking with external business support providers is the "GrowLink" scheme run by the Mjardevi Science Park and as similar scheme (the "Partner Programme") operated by the Technologie Centrum Chemnitz in Germany. In Spain, the 21 BICs have co-operated to prepare a business planning software package. In most cases, business planning and counseling for early stage start-ups is provided free of charge but services provided to established firms appear to be mostly offered on a purely commercial basis. In Belgium at Heracles there is a network of suppliers which is managed by the incubator, and the incubator (a BIC) provides marketing support for its tenants

²⁵ Good examples of incubator activities in the field of technology transfer include the CAT-Symbion Innovation Centre Joint Venture in Denmark, a joint venture to assist in the creation, development and commercialization of new technology-oriented spin-off companies emerging from research undertaken by the diverse research institutes of the region. Bordeaux Productic in France, the Technologie Centrum in Chemnitz in Germany, and Mjardevi Science Park in Sweden all also provide excellent examples of the role of incubators as instruments for commercializing R&D. A key issue here highlighted by the fieldwork is the

wider regional strategy involving the development of a cluster or group of companies supporting a technologically based core organisation. In relation to university-based incubator operations, a key issue highlighted by the research is the extent to which entrepreneurial activity is encouraged by academic administrations. Incubators can of course help to bring this about.

3.5.4 FINANCING START-UPS EXPANSION

Incubators can have an important role in bridging the financing gap between the SME market and the financial community. Venture capitalists have historically tended to shy away from the early-stage venture market. Therefore, incubators often play a positive role in redressing market failure by demonstrating that through a managed approach to enterprise creation risks can be minimized and returns maximized, thereby helping to change attitudes amongst venture capitalists.

One of the rationales for the equity-based, new-economy incubator model is diversification. By investing simultaneously in a portfolio of early start-ups, the incubator lowers the overall investment risk compared to the unique risk associated with each individual company. However, because new-economy incubators invested almost exclusively in one economic sector, the Internet, they bore the full uncertainty and risk of the market in which their portfolio companies operated, and they suffered the consequences once the Internet bubble burst.

In terms of the first financing round for start-up companies with a viable business concept, many incubators have set up their own small-scale seed capital funds which are administered on a discretionary basis by incubator management²⁶. This provides

extent to which universities and other R&D centers encourage the commercialization of ideas, specifically by allowing their staff to engage in business activities.

²⁶ The best example of a seed capital scheme was at the CAT (Centre for Advanced Technology) in Denmark. When CAT provides seed capital funding to a tenant company, the money is provided subject to a number of conditions. On being granted seed financing, tenant companies must relinquish a certain percentage of their equity (usually 10-25%, with a median of around 15%) and agree to the formation of a board of directors with responsibility for overseeing company activities in the same way as any other Public Limited Company (PLC). The presence at a very early stage of the company's development of a board of directors provides companies with access to professional support and enables them to tap into a diverse skills set and broad range of competencies. The only other incubator operating its own scheme is Dublin BIC

financing to get the start-up company off the ground and typically covers the first six-twelve months of operations. With regard to the second round of financing, incubators typically build up a network of contacts and partners in the financial sector who are willing to lend money to early stage ventures and provide tenants with advice on how to prepare their business plan prior to seeking additional venture capital financing to fund expansion.

The notion of providing entrepreneurs with a 'one-stop' system of enterprise support is central to the business incubator concept. However, this does not necessarily mean that all the business incubator's facilities and services need to be provided on an in-house basis: many incubators ensure access for their clients to a complete range of enterprise support through a combination of using staff to provide services, encouraging tenant companies to network amongst themselves, and using external providers. Dependence on external providers may be particularly advantageous during the initial stages in a business incubator's development when cash flow considerations place severe constraints on the level of staffing. Contracting out services may well be in any case justified given the specialist nature of some tenants' needs, for example with regard to training, finance and R&D.

3.5.5. AFTER CARE, NETWORKING AND VIRTUAL INCUBATION SERVICES

A business incubator will seek to provide continuing assistance to its tenants after they graduate (after-care), and may also offer advisory services to small businesses generally in the region (outreach or virtual services).

Whilst the majority of incubators focus on assisting businesses that are physically located in one place, there are some interesting examples²⁷ of "outreach" services and

in Ireland although Taguspark in Portugal is about to introduce one. Elsewhere the emphasis is generally on facilitating access to external, commercial sources of finance. In Spain, the BICs have worked together to create a business planning modeling system for new companies, which includes financing modules.

²⁷ This includes the Centre d'Entreprises Heracles in Belgium, which offers companies the choice of working inside the incubator or receiving advice and services externally. Taguspark in Portugal and science

“virtual” incubation.

A further characteristic of the business incubator model is the encouragement of networking between tenants themselves. As already explained, it is quite common for business relationships to develop between tenants. A further aspect of the internal networking encouraged by business incubators is the informal cross-fertilization of ideas and advice between tenants.

The development of these types of synergies presupposes a degree of homogeneity, which in turn, is a function of the business incubator’s admission criteria. Apart from business relationships, networking can also serve the important purpose of helping entrepreneurs to overcome a sense of isolation that is often associated with their activities and our interviews suggests that this, rather than the more tangible benefits, is in much respect the real advantage of an incubator location.

parks from three other countries (Germany, Finland and Greece) are developing a more ambitious, virtual incubation scheme. Under this scheme, start-up companies will be offered a range of on-line business support packages. In Spain, at Valencia, the BIC provides entrepreneurial support for the Valencia region – it runs training courses for entrepreneurs both inside and outside the incubator, and provides a comprehensive web site for business support.

3.6 INCUBATOR FACILITIES

3.6.1 LOCATION

Business incubators can have very different types of location and can be housed in very different types of premises ranging from purpose-built new developments to converted buildings. The location of a business incubator largely reflects the aims it pursues. Thus, the geographical location of the incubator plays a major role in its success or failure as well as of the companies housed there.

For example, a specialized incubator that focuses on promoting technology-based enterprises may well be located on “greenfield” site, and especially on a science park adjacent to a university, whilst a multi-purpose incubator could be in an inner-city area or on an industrial estate. The following table confirms that there is a large variety of locations:

Table 6: Location of Business Incubators

INCUBATOR LOCATION	NUMBER	PERCENTAGE
Urban	68	54.4
Greenfield	30	24.0
Rural	8	6.4
Other	13	10.4
No answer	6	4.8
TOTAL	125	100.0

Source: CSES analysis of sample

New-economy incubators, tend to be concentrated in metropolitan areas, particularly in cities and regions that combine strengths in technology, creative talent, entrepreneurship, professional services and finance - London, Amsterdam, Stockholm, Munich, Paris are attractive locations for new-economy entrepreneurs and investors to live, work, network and promote themselves.

3.6.2 PREMISES

As with location, there is no standard type of premises occupied by incubators. As the following table shows, whilst many have new purpose-built premises, a significant proportion are housed in converted buildings, often in inner city locations. Clearly, the choice of premises has implications for the cost of establishing incubators.

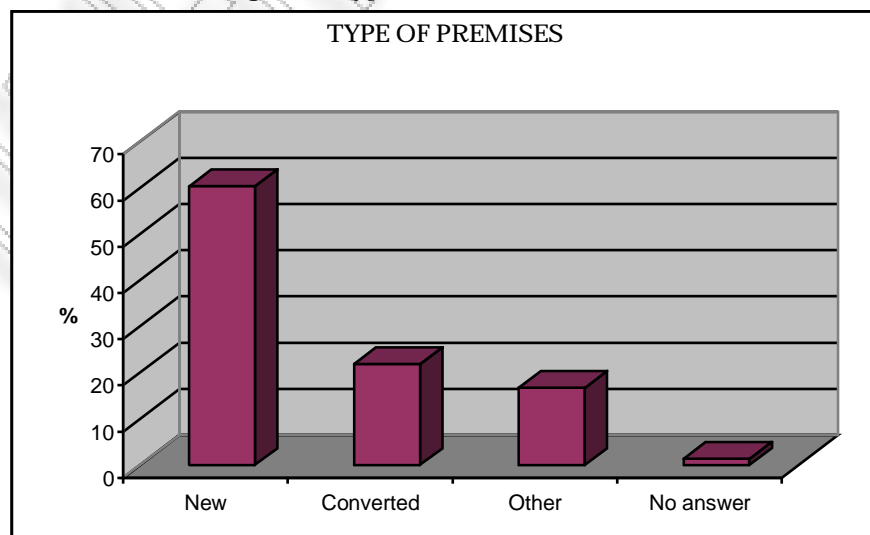
Table 7: Type of Incubator Premises

TYPE OF PREMISES	NUMBER	PERCENTAGE
New	47	60.3
Converted	17	21.8
Other	13	16.7
No answer	1	1.3
TOTAL	78	100.0

Source: CSES analysis of sample

Very few new-economy incubators are housed in newly built facilities, but for reasons largely unrelated to cost. At least in the beginning, when they were managing to raise large amounts of funding, it was more important to launch operations as soon as possible, often in cities where office space is scarce. For young entrepreneurs and information technology workers there is also a sort of "shabby chic" appeal in occupying converted lofts, former warehouses, or antiquated offices. We can clearly understand the previous table with the following figure:

Figure 9: Type of Incubator Premises



Renovating an existing vacant building may in some situations be both faster and less expensive. A “distressed property” may offer a good deal and some funding sources may prefer this option. This requires a detailed engineering survey of the condition of structures, utilities and waste disposal systems. A space can be too large in which case it would increase investment and working capital. Or it can be too small and not able to generate enough income, affecting profitability.

New construction, while initially more expensive, may have lower maintenance and operating costs. For technology incubators, it is difficult to rehab an old building to meet special needs such as wet labs and e-connectivity. An attractive modern space to attract creative people is highly desirable. However, the limitations of finance may require the compromise of beginning in renovated space.

The other major decision concerns leasing the facility, with lower up-front finance requirement or purchase, with prospects of property appreciation, use as collateral for debt financing, and security of ownership.

Important considerations for the selection of existing buildings and for developing a new facility for the incubator include the following:

- Prompt transfer of land or vacant building to incubator entity. In order to minimize delays in start-up, it is critical that legal title or a clean lease, depending on the situation, to the premises (or land) can be passed promptly and without encumbrances to the incubator sponsors.
- Flexible layout. It should be possible to easily and quickly change the layout to adapt to changing tenant needs and to expand the incubator in the future. To be avoided are many entrances, wide corridors, high ceilings, for office space, and high energy costs for heating and cooling. It should provide technology related features such as fast, reliable internet-connectivity, common office facilities, effluent disposal and shared equipment in the case of a biotech facility. The need for warehouse, parking and laboratory facilities must be kept in mind.
- Interaction among clients: The layout has a direct impact on internal traffic to promote interaction between clients. People-flow has to be designed to give opportunities for clients to meet each other and to confront the management team as often as possible.

- Good general condition of building. A vacant building should require minimal capital investment for renovation, to ensure that resources dedicated to the incubator reach the clients and are not dissipated on the facility itself.
- Good security. Interior layout should provide good security through a single entry point. A common office area should be adjacent to the entrance for easy access for both clients and their customers. Interior spaces should provide access to central office area, while ensuring confidentiality and security for individual businesses. The premises should also be environmentally safe.

If adequate funds and vacant land are available, a custom-designed layout offers advantages, especially for technology-specific incubators. But typically in developing countries, finance is scarce and renovation of an appropriate, existing building can save both money and time.

The Ben Craig Center at the University of North Carolina, Charlotte, presents a good layout arrangement. The building with 5,000m² space cost 3.5 million\$ and was constructed in 11 months. It provides the tech-based clients with a creative environment, opportunities of interacting with other clients, and physical facilities to carry out their tasks.

For the Ruhuna Business Incubator in southern Sri Lanka, funds were a severe constraint. Nor was an adequate existing structure available in the vicinity of the Agriculture Department of the University. Available were a dozen small derelict cottages on a verdant hill slope. Some experts said a single building was essential for interactions. But the scattered workspaces were integrated in to a campus, with a resource center at the middle and covered walkways for protection against the sun and rain. Open spaces are provided adjacent to each cottage for agribusiness storage and processing as well as open areas for hydroponics and outdoor activities.

Good design also calls for the ability to generate an income stream sufficient to support the facility and services. The scope of the project should be determined by "backing" into the financial pro-forma. In other words, the projected income stream less the expenses and an amount for reserves should provide for the facility to at least break-even and contribute to administrative costs. Also, the amount of any debt will impact the project and has to be factored into the financial projections.

3.6.3 SIZE

To operate successfully, incubators need to have sufficient capacity to accommodate a minimum of around 20 tenants at any one time and hence to achieve economies of scale. A typical incubator has around 3,000 square meters of incubator space. Given that a limited number of responses at the higher end of the size range can easily distort the average figure, it is more appropriate in this instance to focus on the median figure rather than the average.

Table 8: Incubator Units

PHYSICAL SPACE OF BUSINESS INCUBATOR	SQUARE METERS
Minimum	90
Maximum	41,000
Average	5,860
Median	3,000

Source: CSES analysis of sample

These numbers do not apply to new-economy incubators whose profitability depends on the value of equity they own in incubated companies, rather than on rental leases and service fees. Some of them may host only two or three companies while others may operate as virtual incubators that do not provide office space at all. Size of incubator and its layout within the facility are critical factors in success. It must combine functionality with legal and safety considerations, as well as be modern and attractive in order to present a good image and attract clients.

The incubator is more than a physical facility, not just bricks and mortar. The design and layout are important for the companies it houses. The facility needs to be appropriately sized and compatible with the firms in it. Studies have found that tenant interactions play a significant role in the success of the incubator program as well as that of the clients. For determining the required work-area, calculations should be made on the business plan estimate of the annual revenue from rentals and the expected annual lease rate in the neighborhood. Experience suggests that floor space of about 3,000m², capable of future expansion is the optimum necessary for the start of a new incubator with about 20 to 25 companies; otherwise, rental incomes would be inadequate. It may be possible

to begin with less area, say 1,000m² provided that prospect of more space is assured when needed.

3.6.4. INCUBATOR SPACE

Whilst there is a reasonable degree of variation in the physical size of a business incubator, there are a number of commonalities in terms of other physical aspects. Most incubators aim to provide space for at least 20 tenants and seek to provide a mix of office and workshop space to ensure that units of different sizes are available to suit tenants at different stages of growth (i.e. Ranging from desk space where entrepreneurs can work on their business plans to larger units for mature SMEs), and common facilities such as meeting rooms, canteens, etc.

A key performance indicator is the occupancy rate achieved by incubators. Here a balance needs to be struck by the incubator management between maximizing occupancy, and hence rental income and ensuring that there is sufficient flexibility to enable tenant firms to progress from one type of accommodation to another as they grow. For this reason, 100% occupancy rates are not necessarily ideal. As the following table shows, incubators will typically seek to achieve rates of between 80% and 90%.

Table 9: What percentage of total incubator units is currently occupied

RANGE	%
Minimum occupancy level	30
Maximum occupancy level	100
Mean occupancy level	90
Average occupancy level	85

According to the CSES, there are no significant patterns across EU Member States as far as occupancy levels are concerned. For example, the occupancy rate in France and Sweden are both within 0.5% of the EU average of 85%.

A distinct feature of certain new-economy incubators is the open plan workspace, intended to promote communication and interaction between the tenant companies. This has its advantages and drawbacks, and is clearly more appropriate for incubatees that are to an extent sister companies, all of which are partly owned by the incubator.

3.7 FINANCING START-UP AND OPERATING COSTS

The way in which business incubators are financed and the extent to which they are able to generate sufficient revenue to help cover start-up and operating costs is another critical factor of their success. Most business incubators operate on a not-for-profit basis although a significant proportion (just over one-fifth) is essentially commercial operations.

Table 10: Is the Incubator designed to be for profit or not for profit

TYPE OF INCUBATOR	NUMBER	PERCENTAGE
For profit	17	21.8
Not for profit	60	76.9
No answer	1	1.3
TOTAL	78	100.0

Source: CSES analysis of sample

Most incubators depend heavily on support to help cover their start-up costs and often a high proportion of their operating costs, too. Long-term public support may be given if, or example, it can be demonstrated that investment in a business incubator's operations is a more cost-effective way of creating jobs than alternative policy instruments. However, even where this is the case, there is likely to be pressure on the incubator manager to maximize income generation so that public subsidies are minimized. However, an important measure of a business incubator's success and justification for continued public support is the employment and sales output of tenant companies.

There are some interesting cross-country comparisons to be made. In the case of Italy, for example, there is a much higher percentage of incubators than average (38.5%) claiming to be operating on a for-profit basis. The reverse is true of France, where only 18% of incubator managers surveyed classified themselves as for-profit incubators. The great majority of new-economy incubators are intended for profit, but not necessarily all of them. The basic business model of equity for services can perfectly well be applied in a not-for-profit context, whereby the shares collected by the incubator are placed in a managed investment fund, the income of which helps to cover the incubator's operating expenses.

3.7.1 SET UP AND OPERATING COSTS AND FUNDING

According to CSES, the average cost of setting up a business incubator is just under 4 million €:

Table 11: What was the cost of setting up a business incubator

SET UP COSTS	RESPONSES
No responses/Blank	65/13
Total Set Up Costs	240.873.206 €
Average Set Up Costs	3.705.742 €
Mean Set Up Costs	1.927.000 €

Source: CSES analysis of sample, NB: calculations based on 65 incubators who provided a response

In terms of the sources of finance typically used during the set-up phase, the survey data of CSES suggests that the overwhelming majority of the financing comes from public sources. Just over a fifth of the set-up costs are subsidized by the EU and other international agencies whilst approaching a half of the set-up costs (46%) are funded by national, regional and local authorities.

Table 12: How Business Incubator Set Up Costs are Funded

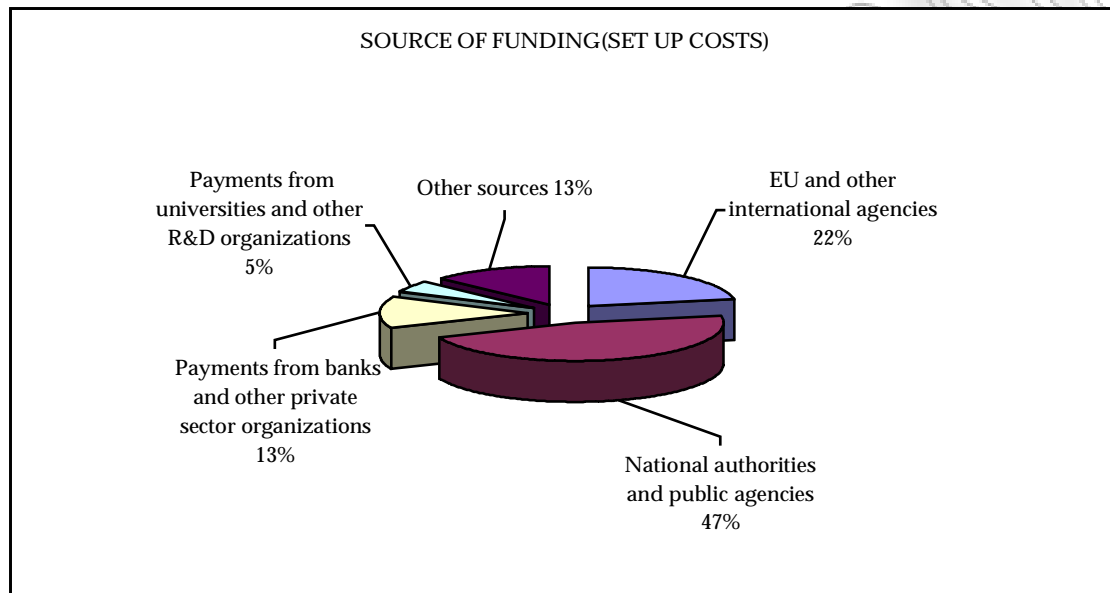
SOURCE OF FUNDING	%
1) Subsidies - EU and other international agencies	22
(2) Subsidies - national authorities and public agencies	46
(3) Payments from banks and other private sector organizations	13
(4) Payments from universities and other R&D organizations	5
(5) Other sources	13
TOTAL	100

Source: CSES analysis of sample

The high initial dependency of incubator start-ups on public financing is in line with expectations – given that one of the functions of business incubators is to address market failure and to facilitate accelerated SME growth to new businesses which, by their very nature, have little in the way of collateral or revenue until they have reached the mature stage of their development, this is perhaps not surprising. The challenge remains to move towards financial self-sustainability over the longer-term by building credibility in

the marketplace and developing a comprehensive range of business support services. The above table also highlights the potential role to be played by the local private sector in kick starting the entrepreneurial process in the local area in partnership with business incubators and other local catalysts of enterprise development. 13% of set-up costs come directly from private sector sponsors:

Figure 10: Source of Funding(Set up Costs)



Turning to operating costs, CSES suggests that the typical incubator has operating costs of approaching 500,000 € per annum.

Table 13: Total Annual Cost of Operating the Incubator

OPERATING COSTS	RESPONSES
No responses/Blank	70/8
Total Operating Costs	33.556.280 €
Average Operating Costs	479.375 €
Mean Operating Costs	300.000 €

Source: CSES analysis of sample, calculations based on 70 incubators who provided a response

Perhaps not surprisingly, payroll and related benefits constitute the highest proportion of outlays. A factor of high importance here is the extent to which overheads such as these can be minimized and resources devoted to incubator services that directly benefit client companies. As the analysis below shows, service provision would appear to account for around 25% of incubator operating costs although other items such as

building maintenance of course also benefit client companies.

Table 14: Business Incubator Operating Costs

OPERATING COSTS	% BREAKDOWN
Total payroll/benefits	41.0
Building costs, e.g. maintenance	22.1
Other costs - services to tenants	24.6
Other costs, e.g. utilities, equipment, supplies, telecoms	13.3
TOTAL	100.0

One way that new-economy incubators effectively control payroll expenses is by paying their staff a partial success fee (in the form of stock, options or warrants for example), an incentive that also helps to align the interests of the staff with those of the incubatees they serve. This approach can also be adopted by traditional not-for-profit incubators, especially those operating as a public-private partnership.

Even though new-economy incubators usually occupy functional, unadorned offices, infrastructure costs (rent, utilities, telecommunications, and computers) are relatively high for various reasons: the location (in cities with high property costs), the Internet access and network requirements, and very often round-the-clock tenant activity.

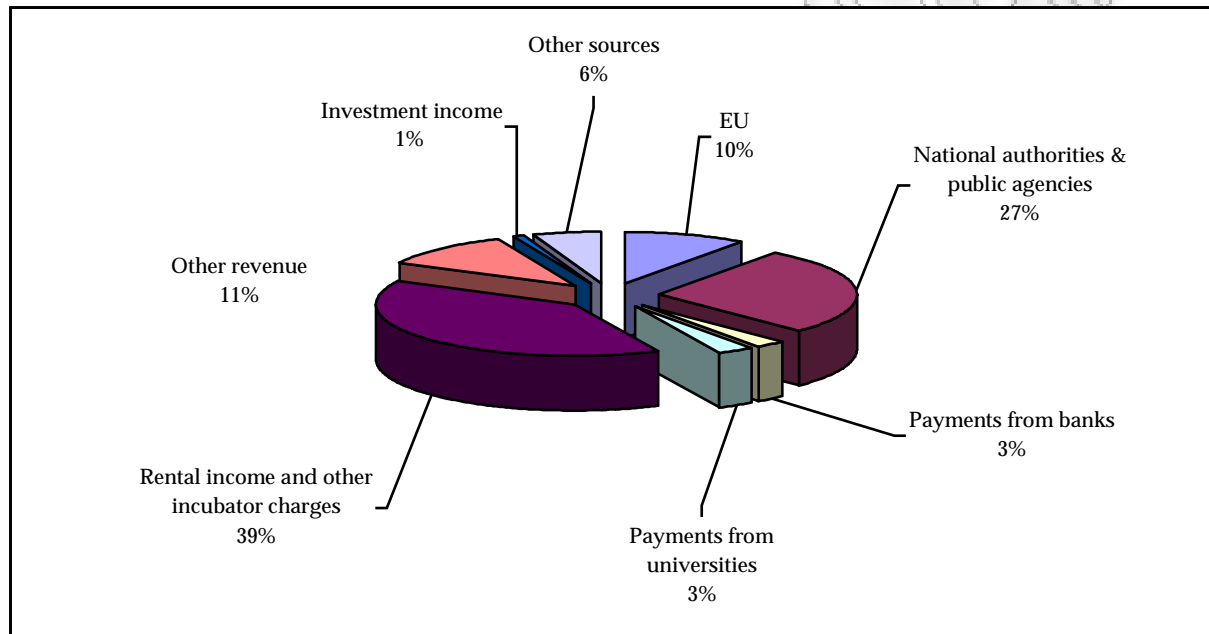
Table 15: Funding of Business Incubator Operating Costs

SOURCE OF FUNDING	%
(1) Subsidies - EU and other international agencies	10.1
(2) Subsidies - national authorities and public agencies	27.3
(3) Payments from banks and other private sector organizations	2.6
(4) Payments from universities and other R&D organizations	3.0
(5) Rental income and other incubator charges	39.5
(6) Other revenue, e.g. from service contracts	11.1
(7) Investment income, e.g. royalties, equity returns	0.8
(8) Other sources	5.6
TOTAL	100.0

Source: CSES analysis of sample

Turning to the funding side, and according to the above table, there are several noteworthy observations to be made from the survey data: first – and following on from the not-for-profit nature of most incubators – public subsidies constitute a very important source of revenue; but, secondly, a surprisingly high proportion of revenue (39.5%) is generated from rentals and other service charges (a further 11% comes from other services).

Figure 11: Source of Funding(Operating Costs)



If it is argued that incubators should seek to maximize income generation, then the proportion of revenue coming from rentals and service charges should be treated as another key indicator of their performance. This has become true for new-economy incubators as well, who can no longer afford to provide hosting and support services in return for equity alone. In their fight for survival, many of them are switching to a hybrid fee structure, charging cash payments for rent and services as well as a reduced equity stake.

3.7.2 ACHIEVING BREAK-EVEN POINT

The length of time a business incubator is likely to take to reach breakeven point (assuming this is an aim) will vary and depend on its strategic objectives and modus operandi. In some lagging regions it may be impossible for an incubator to generate sufficient revenue to cover costs and there is a continuing need for substantial public subsidies. According to the following table, many incubators (40.8% of the sample) have the aim of eventually breaking even but that this is a relatively long-term objective.

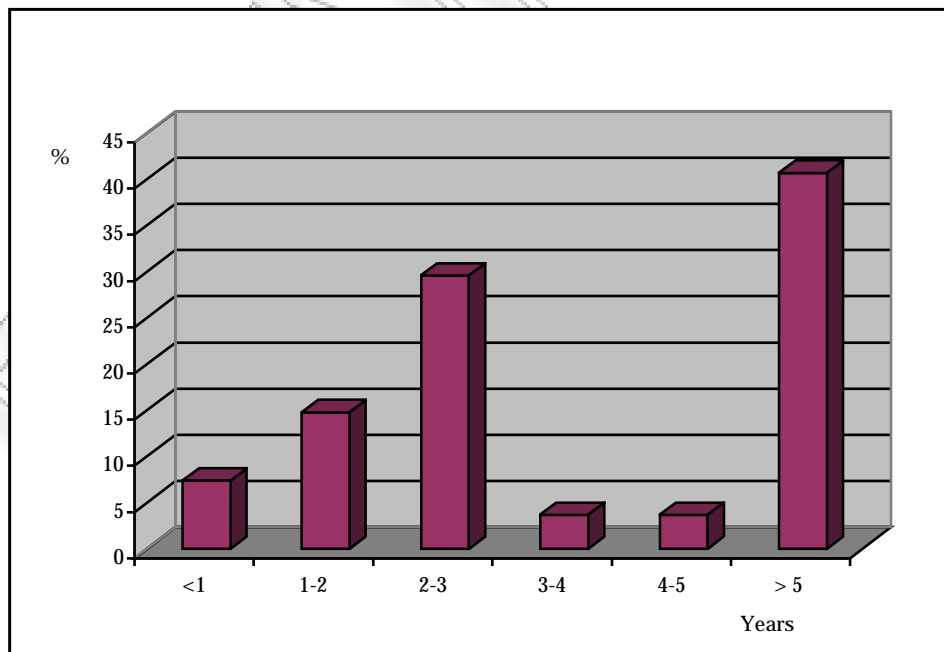
Table 16: Is Break-Even part of the Incubators Business Plan

PART OF BUSINESS PLAN?	NUMBER	PERCENTAGE
Yes	51	40.8
No	62	49.6
No answer	12	9.6
TOTAL	125	100.0

Source: CSES analysis of sample

All new-economy incubators were founded with a forecast of crossing the breakeven point at some stage of their development:

Figure 12: Period to Break-Even



Source: CSES analysis of sample

The research of CSES indicates that where business incubators have been able to break-even, this has been achieved in a variety of ways: rental income from tenants is generally the most important source of income, typically accounting for 40-60% of all revenue.

A high level of dependence on rental income can have negative consequences. During the start-up phase of a business incubator, the need to achieve a high level of occupancy as soon as possible in order to maximize income may lead to the incubator's admission criteria being relaxed to the point where tenants are accepted on a 'first-come-first-serve' basis. Similarly, over-dependence on rental income can lead to exit rules being waived, with successful tenants from whom rental payments can be guaranteed being encouraged to remain in the incubator, whereas it is precisely these enterprises that should be encouraged to 'graduate' and to make room for new admissions.

More fundamentally, a key feature of the business incubator concept is the notion that the relationship between the management team and its clients should not be just that of a landlord and tenant. In this respect, being able to generate income from diverse sources, e.g. business support services, is a good indication of success in fulfilling a broader and more comprehensive role.

Over three-quarters (77%) of the sample of incubators of the survey of the CSES, are not-for-profit organizations, as mentioned before, and not pursuing the objective of reaching a commercial breakeven point. The table below suggests that in most cases, the withdrawal of public subsidies would lead to incubator operations being at best significantly reduced and, at worst, ceasing altogether.

Table 17: If the incubator receives cash operating subsidies and this funding was stopped, what would the effect be on its operations.

IMPORTANCE OF EACH SUBSIDIES	NUMBER	PERCENTAGE
(1) Incubator activities could be maintained at current levels	6	7.7
(2) Incubator activities would have to be reduced significantly	31	39.7
(3) Incubator activities would stop altogether	17	21.8
(4) Not relevant - incubator does not receive subsidies	9	11.5
(5) No answer	15	19.2
TOTAL	78	100.0

Source: CSES analysis of sample

However, whilst there is some anecdotal evidence to support the idea that a public sector incubator run along commercial lines performs better than one which acts as an extension of the public sector business support infrastructure, the extent to which achieving breakeven is viewed as desirable is largely dependent upon the perceptions and requirements of the founding stakeholders. Although the question of whether or not an incubator manages to achieve breakeven clearly has an impact on the future sustainability of the incubator, this needs to be weighed against the outputs achieved by tenant companies in terms of job and wealth creation, and the cost-effectiveness of incubator structures as opposed to other mechanisms for generating the economic benefits.

Proponents of the new-economy incubator model would argue that in order to perform effectively its mission of promoting entrepreneurship and ensuring the launch of successful ventures, the incubator itself should practice what it preaches, achieving profitability and sustainability by sharing in the success of its graduated incubatees.

3.7.3 PRICING OF INCUBATOR SERVICES

The pricing of incubator services is an important management and financial issue. Incubators are charging their clients for the business support services they use in order to help recoup the cost of provision. There are arguments for and against subsidies. It could, for example, be argued that below market rates tend to displace private sector providers and risk undermining the development of business support infrastructures generally in an area. But against this, subsidized rental and other service charges may well be justified by the lack of affordable premises or services in the area concerned.

As the following table shows incubators generally seek to strike a balance in their charging policy – whilst approaching a third of incubators provide services completely or mainly free-of-charge, incorporating the cost of service provision into the general rental package, a higher proportion (66.7%) require clients to pay a contribution towards or to pay the entire cost of a particular service.

Table 18: Adopted approach to the pricing of incubator services

PRICING POLICY	IN HOUSE SERVICES		EXTERNALLY SOURCED	
	Number	%	Number	%
(1) Services are mostly free to clients	24	30.8	3	3.8
(2) Clients charges partly cover the cost of services	36	46.2	23	29.5
(3) Client charges cover the entire cost of services	16	20.5	23	29.5
No response/ Don't Know	2	2.6	29	37.2
TOTAL	78	100.0	78	100.0

Source: CSES analysis of sample

In terms of some of the differences between EU Member States, there is a marked variation between those countries where the cost of business support services provision is largely absorbed by the incubator directly and those where clients tend to cover the majority of the charges²⁸. There is also a difference between countries in which incubators offer a comprehensive range of services in-house as well as a range of specialist services which are procured externally and other countries where support services are mainly provided in-house.

The next table indicates that, in general, incubator charges are generally pitched at either below market rates or around the same level – reinforcing the point made above concerning pricing policies.

²⁸ In Italy, there appears to be particular emphasis on external networking with clients having access to a range of external support services. The majority of incubator tenants surveyed made at least some contribution towards the cost of business support services provided (particularly those services provided externally). Conversely, in France, incubator services are mainly provided in-house with very few tenants covering the full cost of support services.

Table 19: How do the charges for incubator services generally compare with the cost of similar types of services provided by other business support organizations in the area

COMPARISON	NUMBER	PERCENTAGE
Lower	28	35.9
About the same	29	37.2
Higher	3	3.8
No response	18	23.1
TOTAL	78	100.0

Source: CSES analysis of sample

According to the survey of the CSES, there are very differing views on whether incubators should, or should not, seek to recoup the entire cost of service provision from their clients. On the one hand, some incubators argued that services and resources (which can be offered in-kind/pro bono by outside consultants and vendors) are at the core of business incubation and to charge for these defeats the purpose of incubation. Others, however, argued that to the extent possible, all service charges should be recouped through fees or some other method (e.g. royalties, equity stakes).

Before the Internet crash in the second half of 2000, most new-economy incubators did not charge cash fees and took only equity in return for providing infrastructure and services. According to a Harvard Business School survey of 169 Internet incubators conducted in 2000 by Hansen et al, 55% of the incubators had an equity-only business model, 4% charged fees alone, and 41% had a mixture. As of today the proportion of equity only has undoubtedly fallen drastically. The more significant distinction now is between incubators that take equity plus fees and those (such as Techspace for example) that charge fees plus an option to invest in the next round of financing, which they may choose to exercise or not.

3.8 INCUBATOR CLIENTS

The successful performance of a business incubator depends ultimately on the number of clients they attract and the performance of these firms. From a purely operational perspective, tenant companies are the primary source of revenue to help cover operating costs but, more fundamentally, we would argue that the performance of an incubator should be judged ultimately in terms of the performance of tenant companies.

The following table provides an analysis of the number of tenants that are typically accommodated by incubators. It is clearly important to achieve a critical mass in order to maximize the economies of scale with regard to service provision and costs.

Table 20: How many tenant businesses is the incubator currently assisting

RANGE	TENANTS	OUTREACH
Minimum	1	1
Maximum	120	571
Average	32.2	36.6
Mean	18	10
Mean-tenants and outreach companies	28	

Source: CSES analysis of sample

As this table shows, a typical incubator will have around 18 tenants at any one time. Most incubators also provide services to an additional ten or so other companies in the area that are not physically located in the incubator (some of which may be graduates and receiving after-care support). The median figure is a more appropriate measure than the average, which can easily be distorted by a small number of surveys.

New-economy incubators tend to have considerably fewer tenants because of the significant investment they make in each incubatee (typically ranging from €500,000 to 1 million in the form of seed capital and support services). Smaller incubators may focus their efforts on only two or three companies, sometimes originated internally instead of by an outside entrepreneur; the largest ones are really more like publicly traded holding companies with a portfolio of dozens of businesses at various stages of growth. Their size and focus on the Internet sector should have enabled them to foster connections and synergies within their portfolio, but in practice these have not materialized and the share

prices of such holding companies have fallen by as much as 99% over the past 18 months.

Business incubators typically focus on attracting a combination of pure start-up companies and firms at an early stage of development. The table that follows analyses the basic breakdown between different types of companies:

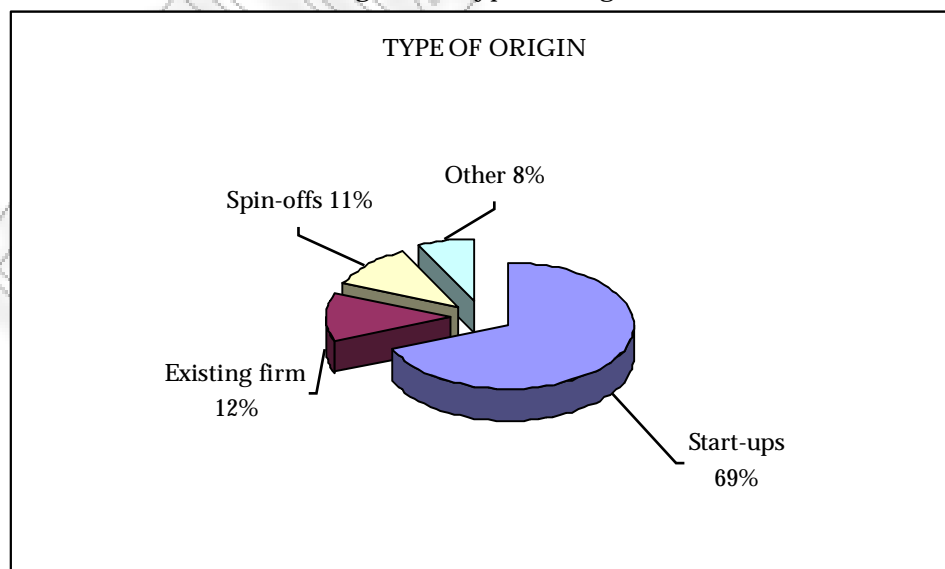
Table 21: Origin of the current tenant businesses

TYPE OF FIRM BY ORIGIN	NUMBER	PERCENTAGE
(1) Start-up	1.544	69.3
(2) Branch of Existing Firm	265	11.9
(3) Spin-off from University or R&D Center	250	11.2
(4) Other	169	7.6
TOTAL	2,228	100.0

Source: CSES analysis of sample – based on 78 responses

The distribution is not very different for new-economy incubators, which initially focused strictly on early-stage start-ups, but now are redirecting their efforts to assisting mature firms to start new businesses. The shift of investor interest away from dot-com start-ups toward technology ventures has also led incubators to increase their collaboration with universities and research centers:

Figure 13: Type of Origin



As noted earlier, a key factor influencing the successful performance of incubators is the number and quality of tenants. The next table provides an analysis of the activities of tenant businesses. As can be seen, a high proportion is engaged in activities relating to ICT. The relatively low proportion in the R&D category is almost certainly misleading since research suggests that whilst few tenants are involved in pure R&D, most incorporate a significant R&D element in their activities.

Table 22: Business activities undertaken by the tenant companies

BUSINESS ACTIVITIES	NUMBER	PERCENTAGE
(1) Sales, marketing and distribution	163	7.4
(2) Business and financial services	316	14.3
(3) Advanced/ High-tech manufacturing	188	8.5
(4) Information & Communication Technologies	746	33.8
(5) Research & Development	106	4.8
(6) Other Manufacturing Activities	150	6.8
(7) Other Service Activities	342	15.5
(8) A combination of some/ all of these activities	199	9.0
TOTAL	2.210	100.0

Source: CSES analysis of sample

3.9 SYNERGIES-AFFILIATION WITH THE KNOWLEDGE COMMUNITY

The incubator is not only about renting space to the incubatees, or providing basic secretarial services. It is about taking one step further by finding all the necessary resources by providing the necessary services and creating synergies with the relevant environment. The successful combination of the above contributes in the development of more stable deal flows and as a result largest percentages of profitable new technology oriented companies.

The question is how to find these resources, to which directions to develop the relevant services and what are the main links with the local, regional or national environment should be established. The creation and the development of a good network is one of the

most vital elements in finding appropriate resources and developing flexible services that at the end of the day ensure the success of a business incubating scheme.

What follows, gives a brief idea on how to contact the different players in the market and the knowledge community and how to develop a functional network that will in turn produce all the necessary synergies that the incubator as an entity can exploit in order to successfully reach its strategic objectives

The research and innovation support and development infrastructures consist one of the main sources of new ideas for entrepreneurial activities. The pools of researchers, scientists, analysts, technology providers and brokers are elements of a continuously evolving system that provides new research and technological output and supports its diffusion. All the above actors have a better understanding of the potential of emergent technologies the possibilities for exploitation of R&D outcomes.

The question is how an incubator that is active in such an environment could secure a constant input of valuable technological and entrepreneurial ideas for exploitation.

3.9.1 TYPES OF INCUBATION NETWORKS

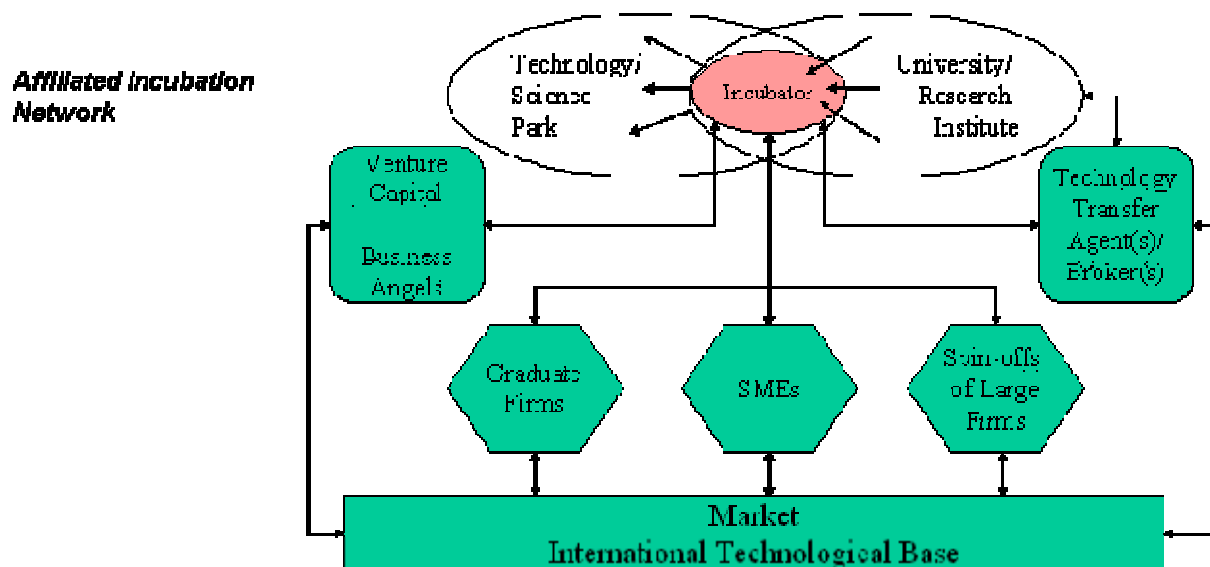
Technology oriented incubators are usually located or related to a research and technological environment. This usually happens in order to take advantage of the human resources and interaction with the scientific and engineering substrates. The positioning of the incubator could follow two different types. Firstly, those incubators that are totally or partially owned by a university/research institute or a technology/science park. Secondly, those that they use the know-how and expertise of such infrastructures but without any kind of ownership.

3.9.1.1 AFFILIATED INCUBATION NETWORK

The basic characteristic of such an incubator is the technological influence from the mother organizations. In most of the cases affiliated incubators have been developed in order to exploit the scientific or technological results of specific research organizations. In that case the research institute often "demands" that the incubator is primarily oriented and affiliated towards its own personnel and often there is common use of scientific instruments.

In the case that the total or partially ownership belongs to a technology or science park the situation is different. If it is a science park it is usually connected to research infrastructures and in that case the previous paragraph often applies. In the case of a technology park the use of an incubator is usually for the nurturing of new start-up ideas in the form of new companies that can not stand on their own in the rest of the facilities of the parks. It is common in this case to have incubators with more entrepreneurial freedom concerning the selection of ideas coming from various technological sources. However, in many cases the dependency on the park does not allow full entrepreneurial responsibility and decision making.

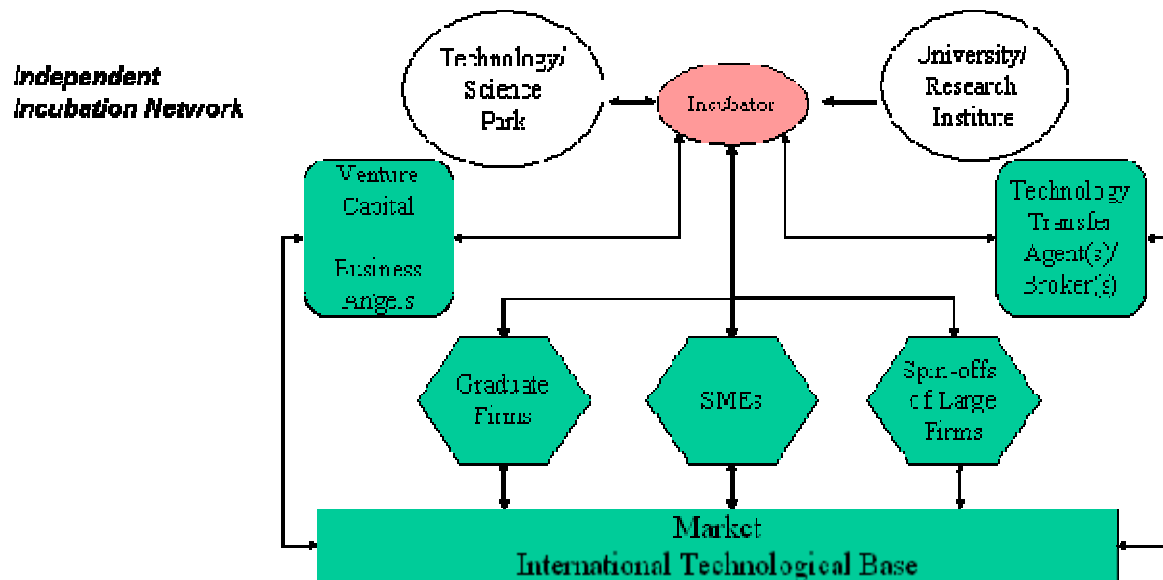
Figure 14: Affiliated Incubation Network



3.9.1.2 INDEPENDENT INCUBATION NETWORK

In the case of an independent incubator the owners of the incubator guide its entrepreneurial activities and search for new ventures. In most of the cases independent incubators are almost obliged to collaborate with the networks of research and technological infrastructure and support organizations. Their independence allows them to collaborate with different partners in the field and to have a more open portfolio of pending ideas and opportunities. Their orientation is in many cases non technological but it depends on the pure entrepreneurial interest of the ventures under consideration.

Figure 15: Independent Incubation Network



3.9.2 WHY AFFILIATING WITH KNOWLEDGE PRODUCING ORGANISATIONS

Focusing in the case of developing an affiliated network for the incubator, there are a number of important reasons for an incubator to be closely linked with the knowledge community and at the same time exploiting the synergies that emerge from such a strategy.

Specifically the incubator can benefit from the following:

- Direct access to the Research & Development outputs of the scientific knowledge base
- Priorities regarding the exploitation of Research & Development results through licensing and patenting
- Direct access to high quality human potential for technical support and spin-off creation
- Direct and continuous support in the creation of new firms based on up-to-date scientific expertise and technological developments
- Direct and prioritized access to advanced infrastructures through collaborations on Research and Development projects

- Constant flow of information regarding new technological trends in specialized scientific fields

3.9.3 KEY SUCCESS FACTORS

There are a number of factors influencing the development of an affiliation activity, which could act either positively or negatively. The positive factors could be:

- Deal flow from the affiliated organizations
- Use of the technical infrastructure
- Access to specialized personnel
- Location proximity (usually)
- Interaction on R&D management with the affiliated organisations
- Information flow & technological networking

On the other hand, the negative factors of such an affiliation could be:

- First priority is the exploitation of the results of the affiliated organization
- Possible participation of Academia in the management of the incubator
- Priority to primarily host spin-off companies of the affiliated organizations' researchers
- Lack of flexibility in investment decision making

Having now identified the main characteristics of such a linkage, the key success factors are:

- University-related not University administered or controlled
- Flexible and not restrictive affiliation
- Efficient technology and R&D exploitation and transfer systems
- Selection of new ventures related to the most promising research activities with strong market orientation
- Professional and flexible IPR services

3.9.4 CORPORATE PARTNERS AND THE NETWORKING ACTIVITY

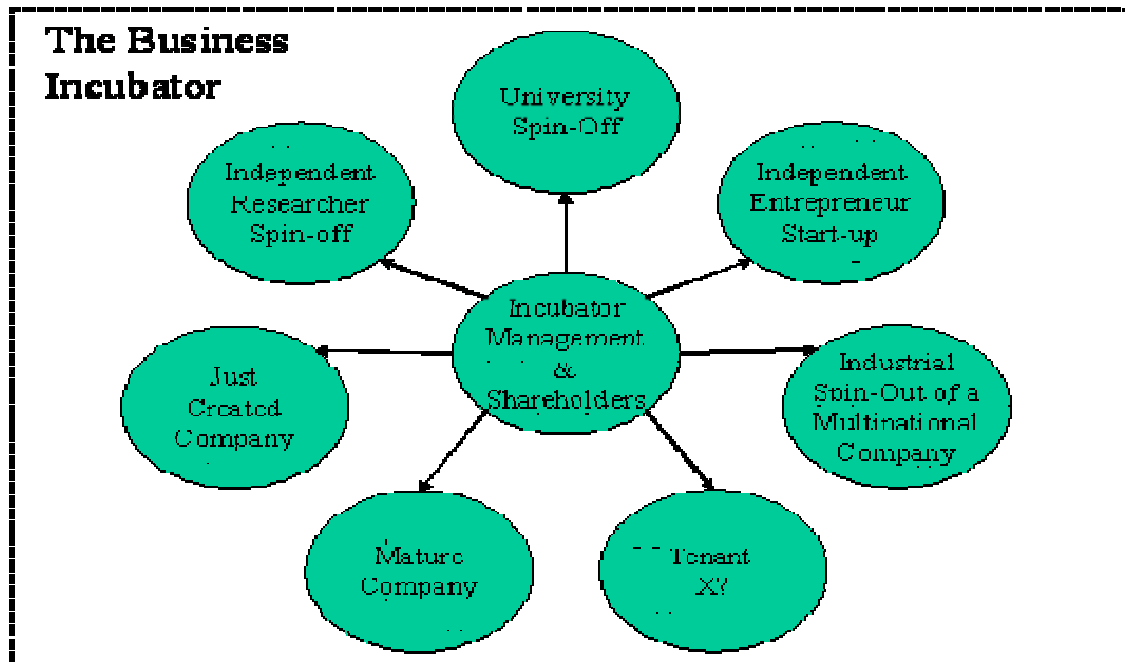
The incubator's success is dependent on its ability to attract new tenants and to ensure a constant flow of potential incubatees. This deal flow is closely related to the manner the incubator develops and manages the relationships with the different corporate partners that directly or indirectly influence the entire system.

Based on that the incubator management has to consider the following important issues:

- Who are the corporate partners of the incubator?
- What is the relationship with each corporate partner?
- What is the influence of each corporate partner on the incubator's objectives & general activities?
- What & where is the interaction point?
- What does the incubator gain from the interaction?
- What does the incubator have to do in order to retain balances?

A business incubator may host a number of different types of tenants, which are categorized in two different main groups; the knowledge community spin-offs and the market spinouts and/or start-ups. The incubator through its affiliation with the knowledge community has the advantage of having access to a pool of potential spin-offs thus ensuring a constant deal flow of tenants. On the other hand, in order for the incubator to attract market start-ups and spinouts, it has to utilize significant resources into intense networking activities with the industry and market environment. These activities could have as a focal point, the affiliation of the incubator with the knowledge community exploiting in that way the prestige a high-level academic or research institution could offer them and therefore attracting the necessary deal flow.

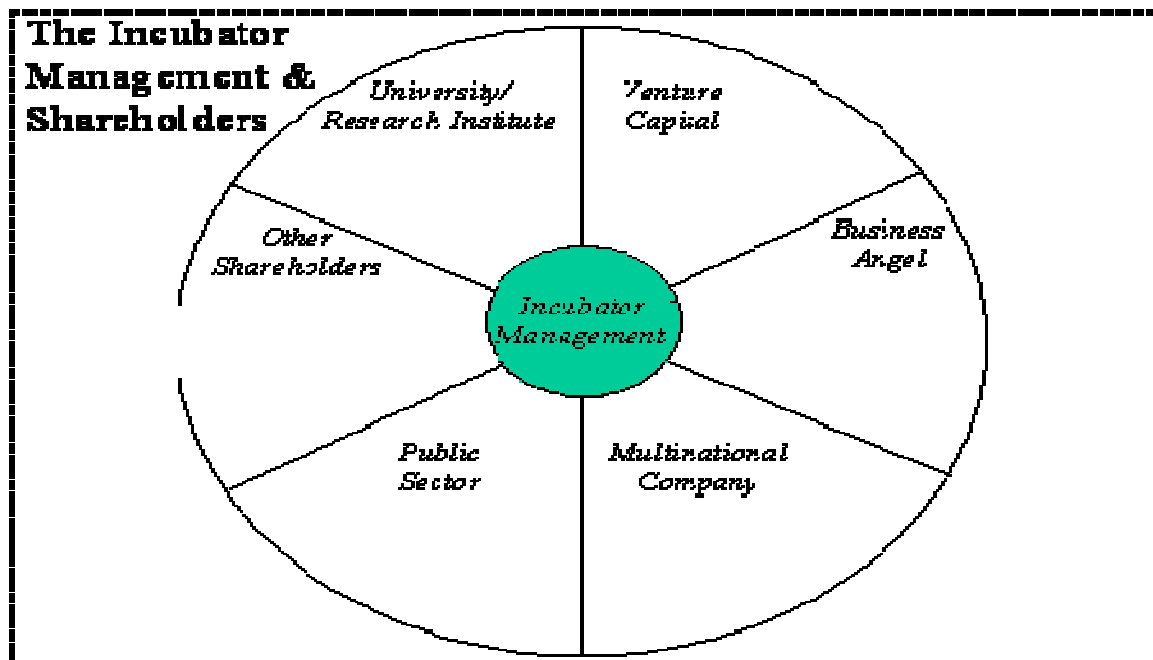
Figure 16: The Networking Activity



The equity of a business incubator may be controlled by different actors, which may have different objectives and goals. If the incubator's dominant shareholder comes from the knowledge community, the incubator's management team has to consider all the positive and negative factors that we have already mentioned in the case of the affiliation with the knowledge community and accordingly adapt its network activities. If on the other hand the dominant shareholder is a financial institution, particularly if it is a venture capital institution, the incubator has to engage into networking activities with the an intense market orientation. Additionally, a Business Angel will influence the incubator in respect of market and personal interest as far as the type of sectors that the incubator will focus on. Furthermore, if the dominant shareholder is a multinational company, the company's own interests will force the incubators management team again to follow very specific activities regarding the types of tenants.

Finally, the case in which the public sector is the major shareholder, the incubators is forces to have a different orientation, usually with not great interest in profit making but it is required to operate as an implementation vehicle of the public's sector policies on the subject.

Figure 17: The Incubator Management



The incubator's management team has to become conscious of the fact that it is not only the companies that it hosts that it has to focus on but also on their main shareholders. In many cases, the tenants are in majority owned by other greater institutions, either these come from the knowledge community or the industry. The networking activities of the incubators must focus on these shareholders in order to create vital marketing synergies that may in the future ensure important deal flow.

3.10. MANAGING AND MARKETING THE INCUBATOR

The issue of marketing is an integral part of every business incubator program and relevant from the very beginning, when the issue of establishing an incubator is being examined. Nevertheless, this is not an effort exercised only during the initial stages of the program, but rather, it is a continuous effort that, in many occasions, evolves with time and according to the stage the incubator is.

Marketing the incubator is not an activity directed only towards entrepreneurs and potential clients but it is also an activity directed to the local community, government

officials, public agencies, service providers, local SMEs, venture capitalists and other investors, research institutes and technology companies that may create spin-offs etc.

Marketing should not be considered as a one time or short period "try and abandon" activity but rather a continuing one that becomes part of the organization and is continually enriched. The ten probably most important attributes of it could be listed as:

- Competitiveness
- Human bonds
- Credibility
- Enthusiasm
- Updated mailing list (stakeholders, prospect tenant companies etc.)
- Promotional activities
- Reputation
- Service
- Brand-name awareness
- Satisfied clients

In summary, the goal of every business incubator is to understand their target market, establish goals and objectives and determine how to implement marketing activities based on those goals and objectives during (a) the development of the incubator, (b) when the incubator is open for business and (c) when the incubator starts producing results and success stories.

3.10.1 TARGETING THE MARKET

Whereas some business incubators have clearly defined target markets, others do not. Incubators without strict pre-determined admission criteria tend to accept clients on a "first-come-first-served" basis. Where admission criteria exist, they include the commercial or technical viability of the project, the entrepreneurial and managerial potential of the prospective tenant, projected growth potential, ability to pay rentals for space, and compatibility of the project's aims with the incubator's objectives.

Some incubators may require potential clients to have prepared a full business plan

before they are admitted whilst others help entrepreneurs to do this as part of the service offering. Similarly, some incubators focus on helping pure start-ups whilst others tend to concentrate on a combination of these and businesses that are already trading but that are still at a relatively early stage in their development.

In this point, it would be useful to present some of the basic data coming from the survey of the Center for Strategy and Evaluation Services. Table 23 provides the most common criteria that are used to define the incubator's target market. In general, new economy incubators, technology centers and other specialized incubators fall very much into the first category, their target market being generally limited to knowledge-intensive business activities. On the other hand, traditional incubators usually target a wider range of projects although there is usually still a focus on innovative projects with significant job and wealth creation potential.

Table 23: Criteria used to define the incubator's target market

CRITERIA	QUITE IMPORTANT		VERY IMPORTANT		NOT IMPORTANT		TOTAL	
	No	%	No	%	No	%	No	%
(1) Must be start-ups	25	32.1	39	50.0	14	17.9	78	100.0
(2) Can be already trading	33	42.3	14	17.9	31	39.7	78	100.0
(3) Must be certain activities	23	29.5	36	46.2	19	24.3	78	100.0
(4) No particular criteria	5	6.4	2	2.6	71	91.0	78	100.0
(5) Other criteria	1	1.3	22	28.2	55	70.5	78	100.0

Source: CSES analysis of sample

The same research suggests that business incubators typically adopt a variety of methods to market their services and to identify potential clients – direct approaches to prospective clients and referrals being the most common methods:

Table 24: Methods used to promote incubators target markets

CRITERIA	QUITE IMPORTANT		VERY IMPORTANT		NOT IMPORTANT		TOTAL	
	No	%	No	%	No	%	No	%
(1) Advertising and media	36	46.1	18	23.1	24	30.8	78	100.0
(2) Business events, conferences	26	33.3	34	43.6	18	23.1	78	100.0
(3) Referrals from other agencies	21	26.9	37	47.4	20	25.6	78	100.0
(4) Direct approach to clients	18	23.1	40	51.3	20	25.6	78	100.0
(5) Other methods	2	2.6	13	16.7	63	80.7	78	100.0

Source: CSES analysis of sample

3.10.2 CLIENT MANAGEMENT

In addition to their overall target markets, most business incubators adopt specific criteria to screen individual applicants. The quality of the entrepreneurs selected for admission to an incubator – their commitment to making a success in business, their experience and skills, the nature of their project, etc – will of course have a very important bearing on how successful the incubator itself is in achieving its mission.

The research of CSES, suggests that almost all incubators adopt a formal set of admission criteria. Table 25 provides an analysis of the sort of criteria most commonly used:

Table 25: Criteria used to screen projects for admission to the incubator

SCREENING CRITERIA	QUITE IMPORTANT		VERY IMPORTANT		NOT IMPORTANT		TOTAL	
	No	%	No	%	No	%	No	%
(1) A business plan must be ready	20	25.6	49	62.8	9	11.5	78	100.0
(2) Financing must be in place	27	34.6	26	33.3	25	32.1	78	100.0
(3) Firm must have innovative project	23	29.5	37	47.4	18	23.1	78	100.0
(4) Firm must have high growth	31	39.7	26	33.3	20	25.6	78	100.0
(5) Other criteria	6	7.7	20	25.6	52	66.7	78	100.0

Source: CSES analysis of sample

The research also suggests that the type of criteria used for this purpose include the commercial or technical viability of the project, projected growth potential, ability to pay rentals for space, compatibility of the project's aims with the incubator's objectives. However, by far the most important factor is that applicants should have prepared a business plan. In some cases, incubators provide office space for entrepreneurs to do this as part of pre-incubation arrangements and in these and other cases, business planning might form an important component in training programmes.

A good example of formal admission procedures is provided by TCC Chemnitz in Germany. In order to gain admission, applicants have to obtain two recommendations – one from the Chamber of Commerce (mainly related to financial standing) and another from the TCC (mainly relating to technological factors). In addition, to obtain premises at the Starthus at Mjardevi Science Park in Sweden, individuals have to have either enrolled on or completed the University's Entrepreneurial Development Programme (EDP). At Taguspark in Portugal, responsibility for appraising applications has been contracted out to the BIC, which has developed a very interesting methodology based on three years research into the characteristics of successful projects supported by IAPMEI (the government agency responsible for promoting entrepreneurship). Elsewhere, for example Project North East in the UK, far less emphasis appears to be placed on formal admission criteria and procedures.

The way in which incubators manage their clients once their businesses are up and running is important in maximizing survival and growth rates. Here there is a very mixed picture: as table 4.2.2 shows, many incubators have formal client monitoring arrangements but equally many do not (34.6%). This suggests that there is continued scope for improvement in monitoring and evaluation processes by incubator management of tenant companies. Generally speaking, those that did not carry out evaluations of the performance of their tenants were located in smaller incubators or had only commenced their operations relatively recently.

Table 26: Adopted approach to client management

	NUMBER	PERCENTAGE
(1) Clients are monitored on a regular basis	41	52.6
(2) No particular client management arrangements	27	34.6
(3) Other arrangements	8	10.2
(4) No response	2	2.6
TOTAL	78	100.0

Source: CSES analysis of sample

As table 26 shows, most incubators have formal exit rules and impose strict limits on the length of time enterprises can remain tenants: the research suggests that in most cases the exit rules will require tenant to graduate and leave the incubator after between 3 and 5 years. This is often written into tenancy contracts but may also be encouraged through a progressive increase in rental charges that leads to a firm paying above-market rates after a specified period (see table 27 below).

Table 27: Criteria used to decide when tenants should leave the incubator

EXIT CRITERIA	QUITE IMPORTANT		VERY IMPORTANT		NOT IMPORTANT		TOTAL	
	No	%	No	%	No	%	No	%
(1) Firms only rent units for a fixed time	23	29.35	33	42.3	22	28.2	78	100.0
(2) Firms leave to get more space	23	29.5	37	47.4	18	23.1	78	100.0
(3) Firms leave when objectives achieved	17	21.8	8	10.3	53	67.9	78	100.0
(4) Firms leave when aims not achieved	10	12.8	14	17.9	54	69.2	78	100.0
(5) Firms leave to get other services	11	14.1	8	10.3	59	75.6	78	100.0
(6) No particular exit criteria	2	2.6	8	10.3	68	87.2	78	100.0
(7) Other criteria	3	3.8	2	2.6	73	93.6	78	100.0

Source: CSES analysis of sample. Note: multiple responses possible

The prospect of failing to graduate is sometimes also a feature of the exit rules operated by business incubators and, conversely, rapid expansion of tenant businesses may necessitate graduation to larger premises outside the incubator. However, the research suggests that some business incubators do not enforce exit rules strictly, especially if occupancy rates are low, because of the need to maximize rental income:

Figure 18: Length of Tenancy

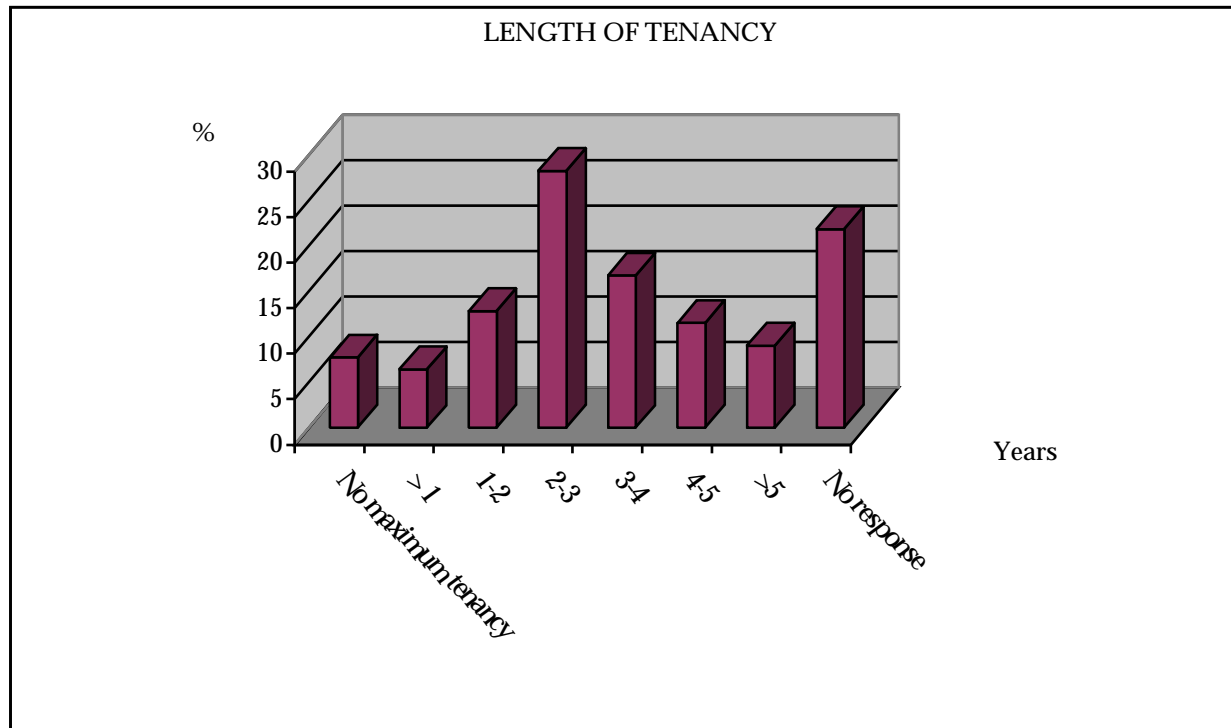


Table 28 provides an analysis of the length of time companies tend to stay in business incubators. The average length of tenancies is 43 months:

Table 28: Maximum length of time tenants can occupy incubator units

TIME PERIOD	NUMBER	PERCENTAGE
No maximum tenancy	6	7.7
Less than a year	5	6.4
1-2 years	10	12.8
2-3 years	22	28.2
3-4 years	13	16.7
4-5 years	9	11.5
Over 5 years	7	9.0
No response	17	21.8
TOTAL	78	100.0

Source: CSES analysis of sample

There are relatively few significant variations across Member States. In Finland, the average maximum length of tenancy is very close to the EU average of 35 months. In Spain and France, the average maximum tenancy is 6 months or so longer, whereas in Italy, a typical incubator tenant can remain in the incubator environment for as long as 53 months. The longer tenancy period in Italy may partly be a reflection of differences in business cycle times. It may equally reflect a more protective stance by incubator management vis-à-vis their incubator offspring, preferring to nurture firms until they have reached a later stage of maturity than is the case in other countries.

There are also important sectoral factors that influence exit rules. In the case of biotechnology incubators, for example, (and any technology incubator whose companies must secure regulatory approvals on processes, patents, trials, and the like) tenants will require lengthier incubator stays than 3-5 years. Pharmaceutical companies in incubation may require 10-12 years incubation. If economic development initiatives are looking at biotechnology, nanotechnology, and medical device development as profile areas, then they must also consider the financial implications of sustaining the incubation of companies over longer periods of time.

A further factor investigated is the extent to which rental charges are adjusted to become more expensive the longer a company remains in an incubator. Usually, when rental charges increase to above market rates, it is quite frequently used as an alternative to fixed-term tenancies to encourage firms to graduate:

Table 29: Does the rental charge vary according to the length of tenancy

INCREMENTAL RENTAL CHARGES	NUMBER	PERCENTAGE
Yes	31	24.8
No	73	58.4
No response	21	16.8
TOTAL	125	100.0

Source: CSES analysis of sample

The residency period in new-economy incubators is considerably shorter. In the early days, some of them boasted that they could turn an idea into a fully operational business in 6 months or less. Of course, in the case of a dot-com the actual business was usually nothing more than a website, earning almost no revenues and making substantial losses. However, the notions of business acceleration and speed to market remain at the core of the new- economy incubation model.

Despite the increased reliance on income from cash fees charged to the tenant companies, the equity stake still provides a strong incentive for rapid graduation. Just like any venture capitalist, the incubator must always consider its exit strategy.

Another reason to maintain a rapid turnover within the incubator is that each class of successfully launched start-ups further expands the incubator's strategic network that can be called upon to assist the next generation of incubatees.

In relation to exit criteria, the use of incremental rental charges means that the incubator manager has of encouraging tenants to move on after a pre-determined period, which is less prescriptive and more flexible than an out-and-out enforced graduation policy. A staggered rental policy also provides new start-ups with a cushion during the early stages when there may well be considerable time lag between the entrepreneur's initial inputs and revenue generation.

For example, at Otaniemi Science Park in Finland, whilst tenants benefit from reduced rental charges during the initial couple of years of the incubation period, the rent subsequently increases steadily by 10% each year over and above the standard rental charge. Imposing financial penalties on those firms which choose to remain beyond their 'due date' is one useful means of ensuring flexibility – tenants have the flexibility to stay if they so choose but are encouraged (by financial means) to graduate and find alternative premises. Penalizing firms financially if they overstay the anticipated three year period is one means of deterring low-growth firms from remaining at the incubator.

3.10.3 HR MANAGEMENT

The quality of the management team is another significant factor for the viability of incubators. The staffing of a business incubator can vary enormously depending on its size and resourcing. However, the research of CSES suggests that a typical business incubator will have on average 2.3 management level staff (giving a ratio of management to tenant firms of about 1:9, based on the median of 18 tenant firms per incubator). An analysis of the number and type of staff is shown in the following table.

Table 30: Incubator's Personnel

PERSONNEL CATEGORY	AVERAGE NUMBER
Managers and Professional	2.3
Secretarial	1.4
Other personnel	1.9
TOTAL	5.6

Source: CSES analysis of sample

The new-economy incubator has a significantly larger staff, typically ranging from 10 to 25 people. The reason for this is the particularly close involvement of the staff in the day-to-day operations and management of the incubated companies. Entrepreneurs-in-residence often work full time with the entrepreneurs, not only in a coaching role but also in taking on interim management positions until a permanent replacement is hired. Internet incubators may have a full-time web development team on staff to design and manage the companies' websites.

Table 31 provides an analysis of the type of qualifications incubator staff have: as can be seen, a financial qualification is the most common type, followed by qualifications in the human resources management and marketing fields:

Table 31: Formal Qualifications of the Incubator Manager

TYPE OF QUALIFICATIONS	NUMBER	PERCENTAGE
(1) Accounting, banking, finance	45	25.6
(2) Real estate, property management	12	6.8
(3) Personnel management, education/training	31	17.6
(4) Legal qualification	21	11.9
(5) Sales, trade, marketing etc.	34	19.3
(6) IT or Telecoms	9	5.1
(7) Other	24	13.6
TOTAL	176	100.0

Source: CSES analysis of sample. Multiple responses possible

Another performance indicator in the incubator management field is the proportion of time that staff spends providing services directly to their client companies as opposed to undertaking routine administrative tasks. Table 32 suggests that providing services directly to clients is seen as the most important function whilst Table 33 indicates that this generally accounts for almost 40% of management time:

Table 32: Objectives of Incubator's Management team

OBJECTIVES OF INCUBATOR	RANKING (1=most important)					Overall
	1	2	3	4	0	
(1) Routine management of incubator affairs	25	23	22	6	12	3.0
(2) Providing advice and assistance to companies	49	22	6	1	0	1.5
(3) Net working with other incubators/organizations	8	23	31	5	11	2.5
(4) Other roles	6	6	5	47	15	3.5

Source: CSES analysis of sample.

Note: The lower the ranking average in the final column, the greater the importance of a given incubator objective

Table 33: Main Functions of the Incubator Management team

PROPORTION OF MANAGEMENT TEAM	%
Minimum	5.0
Maximum	80.0
Average	39.2

Source: CSES analysis of sample.

3.10.4 PERFORMANCE MANAGEMENT

Based on the survey by CSES, we can find a number of existing quality standards for business incubators setting out best practices. Examples of general quality standards that have been developed for business incubators at an international level include the Commission's EC-BIC certification and a similar initiative by the US NBIA, and a UNIDO best practice guide. Quality standards such as these tend to relate to service delivery rather than broader aspects of business incubator operations but they nonetheless provide an important framework for assessing and benchmarking best practice.

A separate issue is how business incubators actually monitor their performance and what sort of more specific indicators are used for this purpose. At the very minimum, an incubator business plan should set out a set of targets supported by measurable performance indicators that enable progress to be periodically assessed. For example, the business plan should contain projections regarding occupancy rates, targets for the amount of rental and other income, and indication of the break-even point.

Table 34 suggests that incubators use a wide range of measures, job creation and occupancy rates generally being the most important of the (non-financial) indicators:

Table 34: Criteria used to monitor the incubator's performance

PERFORMANCE CRITERIA	VERY IMPORTANT		QUITE IMPORTANT		NOT IMPORTANT	
	No	%	No	%	No	%
(1) Incubator occupancy rates	34	18.8	36	23.2	23	14.6
(2) Number of firms graduating from incubator	32	17.7	33	21.3	13	8.3
(3) Jobs created by tenant/ graduates companies	46	25.4	23	14.8	9	5.7
(4) Turnover of tenant/ graduates companies	22	12.2	33	21.3	33	21.0
(5) Financial performance of incubator itself	28	15.5	26	16.8	24	15.3
(6) Other criteria	19	10.5	4	2.6	55	35.0
(7) TOTAL	181	100.0	155	100.0	157	100.0

Source: CSES analysis of sample. Note: multiple responses possible. *It should also be noted that the performance criteria were pre-selected by CSES and not by incubators.*

In addition to financial performance and the routine monitoring of service delivery against non-financial quality standards such as those listed above, some incubators periodically undertake surveys and other research to assess the impact they are having on client companies and the wider local economy. However, the most common method of obtaining feedback is through the informal contact with firms, as indicated in table 35:

Table 35: Methods of obtaining feedback from client companies

SOURCES OF FEEDBACK	TENANTS	%	STAKEHOLDERS	%
(1) Feedback from informal contact	64	41.0	43	40.6
(2) Periodic meetings with clients/stakeholders	42	26.9	34	32.1
(3) Periodic surveys of clients and stakeholders	37	23.7	18	17.0
(4) Other Methods	11	7.1	7	6.6
(5) No particular methods	2	1.3	4	3.8
TOTAL	156	100.0	106	100.0

Source: CSES analysis of sample. Note: multiple responses possible

Viewed from a country perspective, in some countries (e.g. Italy, Spain and France) there appears to be a high percentage of incubators where there are no formal client monitoring arrangements. This may be due to several factors. For example, in Italy and Spain SMEs, are often reluctant to reveal their turnover and staffing details to incubation management, which may be due to traditional cultural factors whereby confidentiality in business is regarded as paramount. France also has quite a number of very small incubators devoted to local economic development and urban regeneration, where there may not be a perceived need for formalized procedures due to limited staffing resources. In addition, in other countries also, a lot of emphasis is being placed on the development of quality standards. The best examples of this are in Austria, France, Germany and the UK. In France, ELAN has adopted the approach of defining the minimum criteria that need to be satisfied to qualify as a business incubator (*norme française*). These criteria are fairly open and stipulate that an incubator should be an essentially a physical entity whose primary objective is to provide both physical workspace and high quality business support services in order to facilitate and accelerate new business creation. In contrast, the quality standards used by UKBI do not stress physical aspects. Probably the most developed approach, however, is in Germany where the ADT is currently piloting a set of quality standards consisting of 75 detailed criteria. These focus on categorizing incubators according to the characteristics of tenant companies, in particular the extent of technology-based activities. In Belgium, the incubator at Heracles has formal quality standards. In Upper Austria a project is seeking to develop higher quality in the management processes of incubators (12 incubators are participating in the programme).

4TH PART: INCUBATORS IN GREECE

4.1 MOST IMPORTANT INDICATORS

Greece is a relatively small country both in terms of size (132 km²) and population (11 million approximately), situated in the southeastern corner of Europe. The country entered the European Union as a full member in 1981 and has participated in the European Monetary Union since the introduction of the new currency (Euro) at the beginning of this decade.

Many sectors of public policy and civil service effectiveness were tested throughout the previous years. The Athens Olympic Games took place in August 2004, while in March 2004, a new Parliament was elected and a new Government was in charge. This Government took various initiatives related to the economy and public finance, the most debatable one having been the re-calculation of the public deficit, which after several revisions resulted in the public deficit being valued at 6.1% of GDP. The deficit has become a major burden for public investment initiatives, followed by the government debt, which remains above 110% of GDP²⁹.

Greek GDP grew continuously in recent years. Due to this trend, the Greek GDP amounted to 82% of the EU25 average in 2004, compared to 72.4% in 2000. A similar picture is given by labor productivity, which came close to the EU25 average (97.2%) in 2004, winning 10 points in 5 years. The problem of relatively high inflation persists despite efforts to curb the effects of continuous demands for higher salaries and of the price adaptation following the introduction of the Euro (€). In the past three years, inflation oscillated around 3.0%. The following table provides the most important indicators of the national economic performance:

²⁹ 2001:-3.6%, 2002: 4.1%, 2003: 5.2%

Table 36: National Economic Performance Indicators

INDICATORS	NATIONAL PERFORMANCE		EU 25 AVERAGE	
	2000	2004*	2000	2004*
GDP per capita in PPS (EU25=100)	72.4	82.4	100	100
Real GDP growth rate (% change previous year)	4.5	4.2	3.9	2.3
Labor productivity per person employed	87.7	97.2	100	100
Total employment growth (annual % change)	0.3	1.4	1.4	0.2*
Inflation rate (average annual)	2.9	3.0	2.4	2.1
Unit labor costs (growth rate)	-2.0	1.0	0.4	-0.3
Public balance (net borrowing/lending) as a % of GDP	-4.1	-6.1	0.8	-2.8
Employment rate (as % of 15-64 population)	55.7	57.8	62.4	63
Unemployment rate (as % of active population)	11.0	9.3	8.6	9
Trade integration of good ((imports+exports)/GDP)	17.9	14.7	-	9*
Trade integration of services ((imports+exports)/GDP)	13.5	10.3	-	3.2*
Foreign direct investment intensity	1.4	0.2	-	1.2*
Business investment as a percentage of GDP	19.5	21.4	18.4	16.8*

Source: Eurostat - Structural Indicators and Long-term Indicators (<http://epp.eurostat.cec.eu.int>)

* Or latest available year (2003)

The figures on employment and investment show the persistence of structural inadequacies. Although employment increased by 2.4% in 2003, the total employment rate of 57.8% in 2003 remains low. Only Italy and several new Member States have a similar rate. Foreign direct investment (FDI) intensity was the lowest in the EU-25 in 2003 (0.2 against an EU25 average of 1.2), the market integration in the goods sector is also the lowest with 14.7 (followed by the UK and Italy, both of which range above 19) while the service sector performs much better (with an integration rate of 10.3 it is in the mid-field of the EU-25). What is more promising is private investment, as a share of GDP, which remains higher than the EU average and compares with that of Ireland and Portugal.

Most companies in Greece are small, traditional and addressing limited local market segments, competing in the globalised world with low cost countries. Businesses spend

very little on RTD and universities resist the development of strong institutional links to industry and economic development. New sectors (ICT, biotech, renewable energy, environment etc) are developing very slowly and cannot compensate for the losses occurring in the traditional economy. Acceleration of the adaptation of the educational and training system to the requirements of knowledge intensive entrepreneurship and global competition, as well as replacement of the traditional stagnant companies by new dynamic technology intensive businesses are major challenges for public policy at present. The inability of the civil service to assume the new roles as catalyser of economic and social development together with the techno-phobic behavior of a large part of the population contribute to further delays in the adaptation phase.

4.1.1 RESEARCH AND DEVELOPMENT

The largest and healthiest sectors of the Greek economy can be found in services – especially tourism, commercial shipping, banking – agriculture, and light manufacturing – especially food processing. Heavy manufacturing industries developed during the protectionist regimes up to the country's entry to the European Community have since been in relative decline. Successive governments in the last two decades have tried to facilitate structural adjustments to the economy towards more value-added, knowledge-based sectors with only limited success until now. There are, nevertheless, several fledgling enterprises in sectors such as health care, software, and communications.

Greece currently spends on research and development less than any other of the fifteen EU member countries. This amounts to only 0.7% of its GDP for R&D compared to an average of 1.9% for the European Community. It has, however, maintained one of the highest rates of increase during the second half of the 1990s. The Greek share of GDP spent on R&D is expected to double (1.5%) in 2010 while the target for the European Union as a whole is 3% for that year (for more information, see Appendix of Part 4):

Table 37: Share of GDP spent on R&D

	R&D intensity, R&D expenditure as % of GDP			R&D expenditure ¹		R&D expenditure financed by business sector, as % of total
	2001	2003	2004	2004 (mio euro)	Annual average growth rate in real terms (%) 2001-2004	2003
EU25	1.93	1.92	1.90p	195 042p	1.3	54.3
Belgium	2.17	1.92	1.93p	5 465p	-2.3	60.3
Czech Republic	1.22	1.26	1.28	1 100	4.5	51.5
Denmark	2.40	2.59	2.63p	5 112p	4.3	61.3
Germany	2.46	2.52	2.49p	55 100p	0.8	66.3
Estonia	0.73	0.82	0.91p	83p	15.6	33.0
Greece	0.64	0.62	0.56p	967p	1.1	30.7
Spain	0.92	1.05	:	8 213*	10.2	48.4
France	2.20	2.18	2.16p	35 648p	0.9	50.8
Ireland	1.12	1.16	1.20	1 780	7.3	59.1
Italy	1.11	1.14	:	14 769*	1.3	:
Cyprus	0.26	0.35	0.37p	46p	15.2	19.8
Latvia	0.41	0.38	0.42	47	8.6	33.2
Lithuania	0.68	0.68	0.76	137	12.2	16.7
Luxembourg	:	1.78	:	426*	3.6	80.4
Hungary	0.95	0.95	0.89	721	1.5	30.7
Malta	:	0.27	0.29p	12p	1.4	18.6**
Netherlands	1.81	1.76	1.77p	8 657p	-0.1	50.9
Austria	2.04	2.19p	2.26p	5 346p	5.1	43.9
Poland	0.64	0.56	0.58	1 139	0.4	30.3
Portugal	0.85	0.78	:	1 020*	-4.3	31.7
Slovenia	1.56	1.54p	1.61p	418p	4.6	59.3
Slovakia	0.64	0.58	0.53	174	-1.8	45.1
Finland	3.38	3.48	3.51	5 253	4.0	70.0
Sweden	4.27	3.98	3.74	10 426	-2.1	65.0
United Kingdom	1.89	1.88	:	30 092*	2.2	43.9
Bulgaria	0.47	0.50	0.51	99	8.2	26.8
Croatia	:	1.14	:	292*	6.7	42.1
Romania	0.39	0.40	0.40	235	:	45.4
Turkey	0.72	0.66**	:	1 280**	-1.0	41.3**
Iceland	3.08	2.97	3.01	297	1.7	43.9
Norway	1.60	1.75	:	3411*	5.2	49.2
China	1.07	1.31	:	16 444*	:	60.1
Japan	3.07	3.15	:	119 748*	1.8	74.5
United States	2.71	2.59p	:	251 577p*	-0.1	63.1

: Data not available

p: estimated or provisional data

EU25: Eurostat estimate

Exceptions to the reference year: * 2003, ** 2002.

% annual average growth is for 2001-2004 except for Luxembourg: 2000-2003; Turkey: 2001-2002; Spain, Italy, Portugal, United Kingdom, Norway, Japan and USA: 2001-2003; Croatia: 2002-2003; Malta: 2002-2004. Luxembourg: Data for the higher education sector correspond to 2001. Hungary: Including expenditure not allocated to R&D units

USA: Excludes most or all capital expenditure

China, USA and Japan: OECD data

Government funds account for three-quarters of the national R&D expenditure. The Greek government has also maintained one of the highest growth rates in Europe in terms of its financing of R&D (Appendix, Table 3). About half of the national R&D effort is carried out by universities and public research institutes. Both publication rates per researcher and their reference are higher than the European average and increasing fast. These, however, apparently do not result in many patents where the share of the country in the European and global total is miniscule, leading to arguments of low exploitation of the knowledge created by universities and research institutes.

The share of private sector financing of the gross national expenditure on R&D currently reaches only 24%. While the private sector's share is projected to rise to 40% of the total by 2010, attaining this target is expected to be a struggle given the unsatisfactory trends of the late 1990s (Appendix, Table 4). However, while Greece and Portugal currently vie for the last place of manufacturing and service sector R&D expenditures as a percentage of GDP (Appendix, Table 5), the long-term rates of increase have been healthy. The country also finds itself at the bottom of the European pile in terms of venture capital investments as a share of GDP (Table 6). A somewhat higher positioning for seed capital apparently reflects the traditionally strong family and friends financing of new enterprises. Interestingly, though, Greece has experienced one of the highest growth rates in venture capital investments in Europe as well.

Table 6 and Figure 4 of the Appendix summarize the picture regarding structural adjustment toward a knowledge-based economy: from poor beginnings, the country has shown a willingness to catch up. The weaker link seems to be the private sector: large indigenous enterprises are in sectors that have not traditionally been at the forefront of investment in new technologies whereas the fledgling knowledge-based companies are too small to make a difference in terms of overall R&D investment. There is promise, nonetheless.

4.1.2 ENTREPRENEURSHIP

In March 2000, the meeting of the European Council in Lisbon set the European Union on a course to become the most competitive and dynamic knowledge-based economy at the global level within a decade, capable for sustainable economic development, with more and better jobs and greater social cohesion. As mentioned above, the targets for Greece have been set to a doubling of the gross domestic expenditure on R&D from a current 0.7% to 1.5% of GDP and an increase in the share of the private sector in this expenditure from a current 24% to 40%.

The key for attaining such ambitious targets is the creation of the appropriate policy and market environment for the development and/or widespread use of new technologies and for the promotion of entrepreneurship. For a country like Greece, this requires nothing short from deep socio-economic changes to support the necessary adjustments from price-based competition to innovation-based competitiveness. Pursuing knowledge-based economy makes 'knowledge' – commercial, organizational, technological – the critical factor and the production/application of knowledge-intensive activities such as information and communication technologies (ICTs), biotechnology, and advanced materials key. Human resources return to the epicenter of policy for development. Entrepreneurship and NTBFs become of paramount importance.

The establishment and success of NTBFs is, however, subject to several problems that appear accentuated in small market economies with no long industrial tradition. These problems revolve around the three 'gaps' that Branscomb and Auerswald (2001) stressed: the funding gap, the research gap, and the information/trust gap. In countries like Greece, business and policy analysts perceive these gaps as insufficiencies in early financing, in specialized consulting services, in networking with foreign markets, and in appropriate mechanisms for intermediation.

Regarding financing, data from the late 1990s indicate that the vast majority of funds (95% or more) for start-up companies in Greece reflect own savings of the entrepreneur or of his/her immediate family. Regarding lack of specialized services, surveys find the Greek entrepreneurs complaining more than their European counterparts for the difficulties in obtaining information on how to start a business. Regarding mechanisms

of networking and intermediation, Figure 5 of the Appendix indicates much lower numbers and density of incubators in Greece vis a vis the EU average.

Data regarding the birth, death and growth of small firms are scarce. A survey on the establishment of new firms in Greece³⁰ showed that 18,9% of the entrepreneurs establishing a new firm in 1998 held higher education degrees while more than half held secondary education degrees. The same survey shows that 60.8% of the new firms were in retail commerce and restaurants, 31% in services to companies, personal services and education, and 6.5% in manufacturing. The majority of the new “firms” established by young graduates were self-employed attorneys, medical doctors and construction engineers (active in house building) exploiting standard knowledge rather than fresh research results. Only 53% of the new companies had a business plan and, among them, 40% had a formal business plan. Almost all (96%) invested personal or family funds in the new venture; 74% did not use loan schemes from banks or other financial institutions.

An important source of information on new business creation is the Global Entrepreneurship Monitor³¹, surveying practices initially in 10 and later in 29 countries. Greece is not included in the study but we find data on comparable countries such as Portugal, Spain and Italy. The 2001 survey shows that TEA³² is higher for secondary degree male holders, followed by post secondary degree holders, while those with undergraduate education come next. In the female population, the ranking is the opposite.

In all cases, those with only primary school demonstrate little interest in creating their own business. GEM reports relatively low entrepreneurial activity in southern Europe in terms of both the percentage of adult population involved in entrepreneurial activity and in terms of the percentage of the adult population that invests in new ventures. It is believed that improved education will remove many of the social, political and

³⁰ “Entrepreneurship Club: The establishment of new companies in Greece: results-opportunities-problems and perspectives”, MRB HELLAS, 1998 (in Greek).

³¹ Global Entrepreneurship Monitor, by P.D. Reynolds et al., Babson College, Kauffman Centre and London Business School, 1999 and 2001 reports.

³² Total Entrepreneurial Activity (TEA): number of individuals per 100 adults who are trying to start a new firm or are the owner/managers of an active business less than 42 months old.

structural obstacles to new business creation.

4.2 THE FIRST POLICY WAVE (1990)

The first government initiatives to develop S&T parks and incubators in Greece were undertaken in 1989, through the funding of public research centers. The policy encouraged universities and other public research institutes to create new firms to exploit their R&D results. It also aimed at attracting other knowledge-intensive enterprises willing to benefit from close proximity to the education and research institutions.

The 1989 public initiatives, led to the building of S&T parks by public research centers at four locations spanning the north-south length of the country: Thessaloniki (Macedonia), Athens (Attica), Patras (Peloponnesus), and Iraklion (Crete). In addition, the National Technical University of Athens established an S&T park in Lavrion (south of Athens) in the abandoned premises of an old mining and metallurgy complex. A sixth park was added in Thessaly early in the current decade. Two subgroups can be distinguished here: the parks of Attica, Thessaloniki, and Patras came first. The parks of Iraklion, Lavrion, Thessaly and Epirus followed right after.

4.2.1 TECHNOLOGY PARK OF ATTICA “LEFKIPPOS”³³

The Technology Park of Attica (TPA) was established in 1990-1991 in the facilities of the National Center for Natural Science Research “Demokritos” in Athens as a technology program aiming at the promotion and support of innovation and technology transfer to industry and the public sector. TPA targets entrepreneurs with innovative ideas for products, processes and services with potential to contribute, through the development of their ideas, to the creation of new markets and the improvement of the national economy.

TPA accepts both existing companies and start-ups with activities compatible to those of “Demokritos”, aiming at their further development, the production of a viable business plan, and the commercial exploitation of their innovative ideas. The strategic objectives of TPA include:

³³ This exposition is largely based on the information provided on the website of the Park

- Connecting research with production
- Creating an environment where R&D labs can meet business
- Supporting new or existing companies to turn innovative ideas to commercially viable productive activities;
- Concentrating under the same roof of companies involved in the activities of interest of the host research center
- Providing the opportunity to tenant companies to evaluate research results and to become mechanisms of technology transfer
- Supporting the collaboration between tenant companies and the R&D laboratories of “Demokritos” and,
- Instigating the collaboration between tenant companies and “Demokritos” labs in national programs of research for economic development.

TPA provides office space, related services, and access to the network of the International Association of Science Parks (IASP) that, in combination to the laboratories and wide scientific knowledge base of “Demokritos”, creates the environment for the development of new knowledge and high value added technologies. The selection of companies is based on the prospects of the applicant’s business plan and the compatibility of the prospective activity with the interests of the research center. “Demokritos” specializes in energy, new materials, microelectronics, information technology, telecommunications, health, environment, and cultural inheritance. The sectors of activities of TPA include electronic business, program management, geographic information systems, telecommunications, biomedicine, pharmaceuticals, biotechnology, and technology evaluation.

TPA has important locational advantages. It is situated close to the center of Athens with fast access to the new international airport of the city. It is also within short reach of significant manufacturing areas with large production units. Finally, TPA tenants have access to some of the best science laboratories in the country at “Demokritos” and are located near to major research universities that cover all natural and social sciences.

The relative disadvantages of the park include space limitations. TPA is operating at a relatively small office space of 320m² which includes eight offices, three of 30m² and five of 20m² and a common use space of only 10m². The offices are equipped with basic office

equipment and broadband on-line links to the network Ariadne. A prospective new building outside “Demokritos” with a planned total of 400m² of office space remains incomplete.

At the moment, the services include furnished office space with all typical amenities (telephone, fax, photocopying facilities, mail, etc), fast links to on-line research networks and the internet, access to European and other research programs, access to the international network of IASP, and access to the research laboratories of “Demokritos”. The monthly office rent is currently an average of less than 300€. Extra fees apply for access to the research labs, participation in the educational programs of the research center, organization of public events in the conference center of “Demokritos” for up to 420 participants, electronic network support for the Ariadne system, and market research services (external subcontractors).

TPA activities are overseen by a three-member committee appointed by the management council of Demokritos. Day-to-day operations are led by the Liaison Office of the research center. The ultimate management responsibility for TPA rests with the Director and President of the management council of “Demokritos”. Six companies were located at TPA in the mid-2003. Five more had been located in the Park since its establishment in 1991.

4.2.2 THESSALONIKI TECHNOLOGY PARK ³⁴

The Thessaloniki Technology Park (TTP) was established in 1990, by the Chemical Process Engineering Research Institute (CPERI), one of the Institutes of the Foundation of Research and Technology-Hellas (FORTH), to enhance the exchange of ideas, people and facilities between universities and industry, thus better connecting applied research and scientific progress to production. The incubator started operating in 1994 on land owned by FORTH/CREPI in the township of Thermi, twelve kilometers away from the centre of Thessaloniki, the second largest city in Greece, situated in the northern province of Macedonia.

The goal is to promote significant opportunities of interchange between industry, CPERI

³⁴ This exposition is largely on the information provided on the website of the Park: <http://www.techpath.gr>

and local universities, including the Aristotelian University of Thessaloniki. All technology transfer activities are managed by a separate company created by CPERI for that purpose called Thessaloniki Technology Park Management & Development Corporation S.A. (TTP/MDC S.A.). TTP/MDC is a member of the International Association of Science Parks (IASP) and a partner of the Hellenic Innovation Relay Center (H-IRC) belonging to the network of European Innovation Relay Centers. A separate board of directors has been elected with a majority of representation coming from major local industries. The Chairman of the Board is from industry, the representative of the Association of Industries of Northern Greece.

CREPI remains the largest shareholder of TTP with 43% of the shares. Other shareholders include the Agricultural and Biotechnology Institute of Thessaloniki with 18% and several private sector concerns with smaller shares. The total area of the incubator is 1,200m² with the possibility of housing up to eleven companies. TTP has easy access to the local airport and local highway system. It is adjacent to the American Farm School, in a pleasant atmosphere and well-landscaped surroundings.

TTP/MDC promotes contacts between local industry and research organizations. The activities of TTP include:

- **Regional Development.** TTP/MDC activities emphasize Chemical Technology, Material Technology, Food & Beverage, Textiles and Energy & Environment. It participates in many European and national regional development programs, identifies present, future and latent industry needs within Northern Greece and links them with technological innovation, and manages an information network encompassing research institutes, industries and regional development initiatives.
- **Technology Transfer.** The Technology Transfer Unit serves as industry-research liaison, performs partner searches, executes assessment and exploitation of research results, and assists with R&D proposal preparation, submission and project management. The unit undertakes measurement and testing of quality control. Furthermore, it ensures information dissemination concerning research results and technological developments, engages in technology brokerage, technology search and assessment, technology transfer agreements, and assistance for technology implementation. TTP/MDC also promotes international technology transfer

between Greece, the EU, the USA, Eastern Europe, and the Balkans.

- **Contract Research.** The Park promotes closer links of industry to local Universities/research centers by raising funds for research related to local industry needs through joint research projects.
- **Contract Education.** TTP/MDC promotes the education of industry personnel by linking Greek industry and internationally recognized experts in new fields of technology. The TTP/MDC also organizes implements and participates in national and European training programs. TTP/MDC studies issues pertaining to professional training and prepares training workshops on the use of technologies.

The incubator building is open to companies, individuals, or legal entities interested in transforming innovative ideas into new technology, products or services leading to a successful business. Eleven companies are currently housed in this building, their activities ranging from e-commerce, to internet services, telematics, software, diagnostic equipment, winemaking research services, automation systems, metrology, and environmental studies. Collaboration with independent investors is occasional. TTP does not participate in the capital structure of the tenant companies.

TTP/MDC supports the companies of the incubator by providing services such as:

- Cooperation with the institutes of the Foundation for Research & Technology Hellas and other research institutes & laboratories
- Access to International Databases
- Internet & ISDN Services
- Information on Intellectual Property Rights and Patents
- Assistance in participating in European Union and National Programs
- Professional Continuing Training Programs
- Financial Advice & Support
- Marketing Services
- Secretarial Support

4.2.3 PATRAS SCIENCE PARK³⁵

The Patras Science Park (PSP) was established in 1989 near the city of Patras (third largest) in the southwest part of the Greece. A business incubator started operating ten years later in 1999. PSP is 100% owned by the public sector³⁶ and was created to exploit the significant research capabilities of the University of Patras, which, among others, includes a full range of natural sciences and engineering departments.

PSP operates in an area of 3,800m² and are divided in four categories:

- Main operating Space, of a total area of 530m², that includes Administration Offices, the finance department, a copier centre, the Reception, a Restaurant, Room of conferences (30 m²), Room of events and congresses (100 m²), and a technical PC centre (50 m²).
- Incubators- (1480 m²) with the following space distribution:
 - 1 Incubator of 120 m²
 - 2 Incubators of 100 m² each, with a total area of 200 m²
 - 2 Incubators of 70 m² each, with a total area of 140 m²
 - 16 Incubators of 50 m² each, with a total area of 800 m²
 - 1 Incubator of 40 m²
 - 1 Storage area of 50 m²
 - 13 Storage areas of 10 m² each, with a total area of 130 m²
- Ancillary Spaces, of a total area of 820 m² that include public spaces (lifts, stairwells, corridors, toilets), deposits, a maintenance office, spaces of electromechanical facilities and air conditioning and other spaces as well (fire unit, centre of nitrogen, etc).
- A ground floor, of a total area of 1200 m², enough to host specialized common laboratories and to temporally accommodate new companies and institutes.

The Park offers services through:

- The Business Innovation Center (start-ups)
- The Business Incubator (new companies in a growth phase)

³⁵ This exposition is largely based on the information provided on the website of the Park: <http://www.psp.org.gr>

³⁶ From 2001 is under the supervision of the Ministry of Development (MoD)

- The Technology Transfer Center

- The Innovative Business Administration Techniques Unit

Facilities include standard offerings such as photocopies, computing, communications, multimedia, basic internet access, meeting and conference rooms, on-line library, dining room, parking space, and hosting of visitors. Standard operating services are available including secretariat assistance, communication (post, telephone, fax and e-mail), entrepreneurial activity organization, and financial administration of projects. Further supporting services include information and brokerage services, database access, technological adaptation methodologies, referral to financing services and cooperation with research organizations, local and across the country.

There are 14 tenants now in the park, including a joint venture and a professional education institute. Their activities are ranging from the design of integrated circuits for telecommunications, to intelligent media gateways, to software, advanced materials, biomedicine, and environmental studies. The companies are theoretically expected to graduate from the park in 3-4 years but the rule has been flexible in the past. In contrast to the other S&T parks, PSP does not actively try to recruit prospective tenants but depends on word of mouth for that function. Technology transfer and networking capabilities seem, however, to have suffered from alleged underfunding and understaffing of PSP.

4.2.4 SCIENCE AND TECHNOLOGY PARK OF CRETE ³⁷

The idea for developing the Science and Technology Park of Crete (STEP-C) goes back to 1988 and a few key individuals in the Foundation for Research and Technology-Hellas (FORTH)³⁸. The managing company of STEP- C (EDAP SA) was established in late 1993 with an initial capital of 40 Million drs. The incubator was established three years later. The main objectives during the inauguration of STEP-C were to interface the significant research activities of FORTH institutes with the outside world, to enable member

³⁷ This exposition is largely based on the information provided on the website of the Park <http://www.stepc.gr>

³⁸ There is a similarity with the Thessaloniki Technology Park (TTP), as discussed earlier. Thessaloniki and Crete are on diametrically opposite poles in Greece (North and South respectively).

companies to exploit the technology opportunities offered by the research institutes, and to assume a development role for the region. Key research opportunities offered by the FORTH institutes include, for example, informatics, microelectronics and laser applications, polymers, prototype development of medical equipment, biotechnology, applied mathematics, and networking and telematics. It was hoped that STEP-C would facilitate technology transfer and help create another development pole on the island, next to the agriculture and the tourist industry.

STEP-C is run by a small dynamic team of experts with a wide scientific and business background. It occupies 4000 m² of a well-designed establishment in a privileged physical location, with temperate climate and a panoramic view of mountain Ida and the Cretan Sea, and is nearby Heraklion, which is the business centre of Crete. There are plans for expansion into several more acres owned by the Research Centre of Crete to meet increased demand.

STEP-C has four key strategic objectives:

- **Technology Transfer:** The Center of Technology Transfer moves research outcomes and other activities to industry. The Park is also charged with attracting the researchers' attention to market needs that require innovative intervention. Companies, full or associate Park members, are also called to play an essential role in the process of technology transfer by exploiting the research deliverables of the institutes and adding value through their own innovative initiatives.
- **Companies:** Companies are encouraged to set up shop and operate under various capacities within the Park's premises and to take advantage of a variety of available skills, techniques and products which enable innovation on their part. STEP-C aspires to become increasingly attractive as an incubator for small, high-tech companies especially in the areas of information technology, biotechnology, laser applications, and services (consulting). STEP-C offers networking support through FORTHnet SA as well as several opportunities which nurture growth, productivity and innovation.
- **Products:** Promotion of the Park products into the marketplace.
- **Educational Center:** Reinforce and retrain key company members through advanced offerings, especially in the management area.

STEP-C collaborates with many public and the private organizations. It includes and provides services to 28 companies as full members and many more as associate members. These companies, some of which are spin-offs and others that have joined the premises of the Park, cover areas such as electronics, medical equipment, systems integration, software, telecommunications and telematics, applications of applied mathematics, industrial automation, management of R&D projects, and technical and quality consulting and evaluation. In addition, there is a regional industrial representation in ceramics and plastics.

Generally speaking, the services offered by the park and incubator, are related to the physical space and infrastructure, and to expert consulting (also including networking with research institutes and the university). Like the other S&T Parks in this section, there is no provision of systematic financial services in the form of seed capital, venture capital, and investment networks. The companies entering the incubator sign a three-year contract requiring annual evaluation and providing the possibility for extension if appropriate.

STEP-C is located in close proximity to some of the best research centers and higher educational establishments in the country with international reputation. It emphasizes information exchange and research deliverables not only locally but also from other domestic locations (i.e. Patras and Thessaloniki) as well as international sources. Its Center of Technology Transfer is a set of consultancy and technology support services available to companies at affordable rates. The basic objective of CTT is knowledge dissemination, the promotion of innovation, and the strengthening of competitiveness of SMEs. The CTT can offer to SMEs:

- Technical and technological support
- Infrastructure for executive education/training in the modern principle of technology management
- Creation of mechanisms for the promotion of products in national and international markets
- Maintenance and operation of information technology systems.

The park has benefited greatly the region by creating more than 600 new jobs, by developing technology-intensive firms, and by facilitating the collaboration of the

research institutes with industry.

4.2.5 TECHNOLOGY PARK OF THESSALY³⁹

The Technology Park of Thessaly (TE.PA.THE.) was established in December 2001 by the Metallurgical Industrial Research & Technology Centre S.A. (MIRTEC) and 38 other shareholders, mainly agencies and companies of the region of Thessaly as the first regional park in the country.

The overall goal of the Park is to encourage activities to facilitate the transfer of technology and knowledge from research institutes and centers to private companies. TEPATHE aspires to bring together industry, academia, research institutes and the public sector to lead Thessaly to a knowledge-based society. The main objectives of TEPATHE are to:

- Accelerate the establishment of new dynamic high technology companies that will create new jobs and will be commercially viable when they exist the incubator
- Encourage improvement of existing companies with the introduction of new technologies and the exploitation of research and technological services in the region
- Support sustainable local and regional development

The Technology Park of Thessaly is supported by private funds. The main sources of funding are the initial capital infusion, the rent of tenant companies in the incubator, and the income from consulting services to these companies. The Park fosters and supports new and dynamic high-tech companies not only from Greece but also from around the world. The Park does not have a specific technology focus. It offers to tenant companies all basic support services related to the use of leased space including administration and reception services, networking-internet services, logistic services, access to scientific library and to the patent office, office cleaning, of the space, mail, meeting rooms and conference room, security, parking space, and restaurant. It also offers consulting services that include coaching, legal advising, business and marketing planning, technology brokerage, and financial support including venture, and seed and angel capital.

Other available facilities include photocopying and facsimile services, business and

³⁹ This exposition is largely based on the information provided on the website of the Park: www.tepathe.gr

technology support services, catering etc. Incubation facilities were developed in MIRTEC's premises in the A' Industrial Area of Volos (main regional city) through a project financed by the Region of Thessaly. A 4,111m² flexible space equipped with modern infrastructure is available to accommodate new businesses at a very low rent. Of this space, 1,777m² is allocated to offices (16), laboratories (7), industrial areas for pilot applications (6) and the rest is designated as supporting space.

The Technology Park of Thessaly encourages companies, natural persons, or legal entities to come and operate under various capacities and also to take advantage of the variety of skills, techniques and products. Fifteen companies are located in the S&T Park/Incubator. Their activities range from industrial design, hard tissue implants, multimedia, computer software, internet and telecom services, robotics, surface technology for electronics, advanced materials, etc.

Overall, the management of TEPATHE regards the Park as quite successful in meeting its goals until now. In addition to a significant number of tenant start-up companies, its role in transferring technology from abroad, the preparation of a several patent applications, and the graduation of a company due to its rapid development, the Park has already contributed to the local economy with the creation of an estimated 35 local jobs. In the near future, the Park is planning to establish an information network including research institutes, industries and regional development initiatives. Its incubator function will be further intensified aiming at the rapid graduation of tenant start-ups to independent premises. The following objectives have been set in the near future:

- To develop the necessary infrastructure for providing technical assistance and services, including consultancy and management training
- To organize the collection, presentation and dissemination of the relevant information and the development of a marketing platform
- To support the host companies with venture capital and seed capital for their development
- To encourage international companies and associations to use the Park's facilities

4.2.6 TECHNOLOGICAL AND CULTURAL PARK OF LAVRION⁴⁰

The Technological and Cultural Park of Lavrion (TCPL) was established in 1996 by the National Technical University of Athens (NTUA) on land and installations of the failed old company “Companie Francaise des Mines du Laurium”. Since the late 19th century, this company had reignited a very important and very old tradition of mining and metallurgical activity in the Lavrion area, 50 kilometers southeast of Athens⁴¹. The university bought the land and old management and production buildings of the company in 1992. The Park opened its doors to companies in 1999.

TCPL is fully owned by the National Technical University of Athens. Its objectives are to:

- Transfer technology and know-how for the research laboratories of the university to the private sector.
- Help create technology-intensive companies by facilitating access to services and funding that support the development of entrepreneurship
- Support through technology the development efforts of Lavrion and of the broader metropolitan area of Athens.
- Preserve and valorate the mining and metallurgical installations of the Companie Francaise des Mines du Laurium; showcase the special social and cultural heritage of the area.
- Create a technological and cultural pole of national stature that will synthesize the historical memories of the past with the developmental prospects of the future.

The Park is situated near the new international airport of Athens and has easy access to a new major motorway connecting east and southeast Attica where the park is situated with the rest of the country including Athens and Piraeus, west Attica (with a major industrial area) and Peloponnesus in the south, and the north. The Park started by offering space in the renovated industrial buildings and the associated basic services (electricity, telecommunications, security, maintenance). It is rapidly ramping up to offer

⁴⁰ This exposition is largely based on the information provided on the website of the Park: www.ntua.gr

⁴¹ The first known mining activity in the Lavrion area dates back to 3000BC. Mining and metallurgy reached its zenith between the 6th and 4th centuries BC during the golden era of the Athenian democracy.

the full services of an S&T park/incubator including:

- Administrative and secretarial support
- Networking with sources of seed and venture capital
- Operational and consultancy services related to the building of business plans, logistics, legal services, market studies, etc.
- Research and technological services in connection to the teaching departments and research laboratories of the National Technical University of Athens (the oldest and prime engineering university of the country)
- Use of specialized facilities such as conference centers and multimedia center for on-line conferences
- Information services including fast network facilities (broadband connections) and the electronic use of the university library
- Leisure (athletic facilities, restaurant)
- Professional education
- Specialty services to support e-commerce and distance on-line research collaboration

The overall area of the Park is 245 acres, with built area of 40,000m². About one-fourth of the built space is available for tenant companies. TCPL emphasizes certain technological areas including information and communication technology infrastructures and “green” technologies for production, effluent treatment, and environmental remediation. Targeted enterprises that fit to the strategic plan of the park include those concentrating on manufacturing, energy production and new energy sources, applied research for manufacturing, energy, and mining, technological and industrial design, high technology services, computer software, and high quality services. Fifteen companies are currently operating in the Park.

Legislation in 1998 placed TCPL in the third zone for financial support of private investments for peripheral development. The companies operating in the Park are, thus, eligible for significant public support including the subsidization of investment capital, lower interest rates for borrowed investment funds, and tax incentives. The attraction of the Park is already significant: the tenants also include foreign firms like “Pyrogenesis” and “Fotronics” from North America.

The socio-economic benefits of TCPL are expected to be significant. There are alleged

significant benefits to research through the support of new researchers, the linkage of scientific research with industrial application, and the introduction of the resulting experiences in the classroom. In addition, TCPL management points out societal returns through the preservation of an important cultural heritage, the environmental upgrading of a delinquent industrial site, and the expected upgrading of the region through the prospective location of high technology companies in the Lavrion area.

4.2.7 SCIENCE AND TECHNOLOGY PARK OF EPIRUS⁴²

The Science and Technology Park of Epirus was established in 1999 by the University of Ioannina and the Region of Epirus at the northwestern corner of the country. The major objective of the Park is to act as catalyst of innovative activities in the region and operate as an interface between research Institutes and the outside world targeting the development of the region of Epirus. The operation of the Park will be undertaken by the management company Science and Technology Park of Epirus S.A., established in September 2003. A call for tenders will be open for legal entities and others to participate in the capital of the S.A. STEP-Epirus has developed collaborations with organizations from both the public and private sector.

STEP-Epirus occupies a building of 2,700 m², located 4 Km from Ioannina close to the University of Ioannina. The Park has twelve units to be used for new innovative activities or by already, established companies can use (incubator). The Park offers a series of products and services to full and associate member companies like:

- Promotion of products and services
- Support in management and marketing
- Financial services
- Secretarial support
- Standardization – certification product design
- Dissemination services
- Organization of seminars and conferences to support member and non-member

⁴² This exposition is largely based on the information provided on the website of the Park: www.step-epirus.gr

- Companies in developing high quality personnel

Companies that do not wish to be housed in the Park are offered the possibility to have access to the services of Park, having also the right to use the Logo of the Park. Companies are regularly informed about issues such as private investments, funding, participation in national and European programs, and knowledge transfer.

The Park cooperates with academic and research institutes: direct access to the laboratories of the University of Ioannina and to other research laboratories is very important. The two Institutes of the Park (foods, materials) offer standardization, certification, testing of the products of industrial foods and structural material. The Park is also collaborating with Greek and international standardization bodies.

4.3 THE SECOND POLICY WAVE

In the context of the most recent multi-year allotment of Community Structural Funds to Community peripheries, the European Commission approved in March 2001 the Greek proposal for a comprehensive industrial “Competitiveness” program to continue the implementation of the necessary industrial structural adjustments. The priorities of this program that directly relate to innovation and entrepreneurship include:

- Improvement of the entrepreneurial environment
- Support and encouragement of entrepreneurship
- Promotion of entrepreneurial ‘success’
- Technological research and innovation
- Differentiation of tourist services – advancement of Greece as a tourist destination

The specific mechanisms of the “Competitiveness” program targeting New Technology Based Firms (NTBFs) include funding support of spin-offs, mechanisms for incubation of innovative firms, and mechanisms for intermediation/liaison offices (e.g., university-industry). Specific programs include:

- Program “PRAXE” for validation-commercialization of research results (€ 76m.)
- Program “ELEFTHO” for the creation of S&T parks and incubators (€ 68m.)
- Liaison offices in institutions of higher education for the commercialization of research results and for networking of researchers with sponsors (€ 30m.)
- Program for technology intermediation for strengthening various technology transfer organizations (€ 5.9m.)
- Program “AKMON” for the development of research centers with technology user participation (€ 30m.)
- Program “TECHNOMATHEIA” for the familiarity of school teachers and students with research and technology (€ 3.9m.)

Our concentration will be on the programs “ELEFTHO” and “PRAXE” since they support S&T parks and incubators, on one hand, and newly established NTBFs directly, on the other.

4.3.1 RECENT HISTORY OF S&T PARKS AND INCUBATORS IN GREECE

Despite the progress in the last fifteen years or so, the country remains with a small number of business incubators compared to other EU member states. It is indicative, for example, that in Austria the analogy is 1 incubator per 3,000 enterprises whereas in Greece this ratio is 1 to 106,000. Systemic weaknesses also include:

- Limited seed capital outside own funds and family/friends support
- Limited venture capital (there are only sixteen venture capital funds in Greece, which invest only in mature enterprises and are not sector-specific).
- Cumbersome incorporation procedures (it is estimated that to incorporate a new enterprise in Greece, one must go through 53 administrative acts compared to 11 in the United Kingdom and 3 in Canada).

The 'teething' problems of the 1990s led the Greek government to the conclusion that policy schemes to support the design and development of the second generation of S&T parks and incubators should require the active involvement of private actors both in managing and in funding the projects. Public funding would not exceed 50% of the total cost of the project. Moreover, emphasis should be given to what actually makes incubation effective, beyond material infrastructures: consulting services and the availability of risk capital. The program "ELEFTHO" reflects these considerations.

4.3.2 PROGRAM "ELEFTHO"

The ELEFTHO program provides incentives for the establishment and operation of S&T parks and business incubators of private initiative in order to foster the development of innovative and knowledge-intensive enterprises, especially through their start-up phase. A prerequisite for government funds is the dedication of high percentage (over 70%) of the available capacity of the park to tenants, especially start-up companies. The intended recipients of public assistance are private enterprises of any national origin planning to establish and operate an S&T park-incubator in the territory of Greece to host knowledge-intensive enterprises.

The recipients of public assistance are, of course, expected to operate as channels through which a significant part of the support is transferred to the ultimate

beneficiaries, i.e., tenant NTBFs. Typically, newly established enterprises hosted in incubators employ less than 10 people and initially require 50-100m² of floor space for their activities. Enterprises hosted in S&T parks are of larger size, but rarely exceed 250 employees. In order to secure that the recipient transfers part of the government aid to the final beneficiaries, the funding government agency (GSRT) will play an active role in monitoring company traffic in and out of the parks and incubators and the capitalization of seed capital.

- The government subsidy has the form of a grant to the enterprise owning and operation an S&T park/incubator. Eligible expenditures include:
- Equity participation of the S&T park/incubator in an enterprise (seed capital)
- Operating expenses of the S&T park/incubator
- Cost of consultancy and outsourced services
- Capital expenditures for site development, construction and installation of the needed infrastructure for tenant housing and networking. The cost of the land is eligible up to 10% of the eligible costs.

The capital infusion by the incubator to a single enterprise is limited to € 750.000 per semester, if the ELEFTHO program aids such infusion. The assistance under the ELEFTHO program cannot be cumulated with financing received through other public sources towards the park-incubator and is capped to € 7.5m for each project. Public funds cannot exceed 50% of the total investment. The duration of the financial aid for each project extends up to three years; any extension is subject to review by the appropriate public agency (GSRT). The supported companies submit annual progress reports including quantitative and qualitative indicators demonstrating their beneficial effect on the establishment and operation of enterprises.

The ELEFTHO program extends from 2002 to 2006 with a total projected public expenditure of € 100m. (68million € for the period 2002-2006). The aid under ELEFTHO is provided following a public invitation to tender, open to all eligible incubators and S&T parks that are registered or will be registered and based in Greece. The program will continue to accept proposals for the full term of its duration. Importantly, proposals are not competed but are chosen on the basis of fulfilling the requirements set forward in the tender, decided through several rounds of expert reviews. That is to say, the

program purports to support well-documented plans for an S&T park/incubator that can function effectively as a provider of services to innovative enterprises; additionally, in the case of an incubator its ability to provide early stage funding to start-up enterprises.

4.3.3 PROGRAM “PRAXE”

In parallel to “ELEFTHO” and for the same time duration (2002-2006), the program “PRAXE” has been implemented to directly assist NTBFs, especially those spinning off from universities and research institutes. PRAXE aims at providing limited aid to NTBFs during their start-up phase, helping to reduce the investment gap, encourage market investors to provide risk capital to the target enterprises, and promote the culture of entrepreneurship among individuals of higher levels of education. The main objective of PRAXE is the development of new business activities by academics, researchers and, in general, inventors with university degrees or high level technicians through spin-off enterprises in which they participate themselves.

PRAXE consists of two related phases, each separately tendered:

- PRAXE A covers the preparatory activities before the establishment of an enterprise, such as experimental development, patenting, drafting of a business plan, search for potential private investors undertaken by the researchers and their institutions. Funding is capped to € 44,000 per project.
- PRAXE B covers start-up or other early stages of development and beyond. State assistance is provided conditionally and limited to small transaction sizes. In accordance to the European Commission’s communication C 235 (21.8.2001), the measure confers assistance to companies invested in and thus acts in a complementary mode to other measures assisting funds and funds of funds.

The expected results of PRAXE include:

- Reduction of the equity gap, encouraging market investors to provide risk capital to the targeted enterprises,
- Promotion of entrepreneurship in higher education and research institutions,
- Expansion of employment, especially in knowledge-intensive sectors,

- Exploitation of the research results, technological developments and know-how of research centers, higher education institutions, technological units and sectoral enterprises of industrial research, through the establishment of new enterprises.

PRAXE B covers the development plans of spin off companies, relating to the start-up or other early stages of development and beyond, up to three years. The funds cannot be used to supplement other government assistance. The government assistance (grant) is awarded as a complement to the private equity invested in the spin-off company and does not exceed the equity contributed by the private investor(s). The overall amount of the state aid may not exceed € 1million. In combination to the equivalent contribution by the private sector, the award must be spent to acquire one or more of the following:

- Material infrastructures such as equipment, instruments, buildings, land and the installation, calibration and initial operation of facilities,
- Working capital for up to 24 months, with a possibility for six-month extension for longer gestation period areas such as biotechnology and pharmaceuticals,
- Intangible assets, such as patent rights, licenses, know how, technical assistance, and consulting services from professional managers, attorneys, accountants etc.

The assistance to NTBFs is provided by the General Secretariat for Research and Technology following a public invitation to tender, which can be accessed by all spin-off companies established in Greece, independent of the nationality of the private equity providers. Tenders may be submitted by spin-off enterprises that are majority-owned by private investors that demonstrate the exploitation of academic or other research knowledge. Other stockholders could include public organizations such as universities, research institutes, local authorities, utilities and the like. Researchers may participate in the venture as stockholders, managers, staff members, or simply as licensor of their know-how to the spin-off company. "Researchers" include staff employed in research institutes, members of the faculty of higher education institutions, specialist scientific and technical personnel of higher education institutions, collaborating and visiting researchers, graduate and post-graduate students.

Tenders are evaluated by independent expert committees on merit criteria:

- Compatibility with the terms and requirements of the call for tenders.
- Completeness of the business plan of the spin-off company.
- Solvency of the shareholders of the spin-off company.
- Previous training and practical experience of managing staff (incl. outsourcing) of the spin off company.
- Completeness of the data concerning the shareholders' capacity to contribute their part of the share capital and the operation capital of the spin-off enterprise.

PRAXE is projected to run for the time period 2002-2006 with a total public expenditure of € 60 million. Up to now, 239 PRAXE A projects have been financed and eight spin-off companies have entered the PRAXE B Program.

4.4 INCUBATORS SUPPORTED BY “ELEFTHO”

Five private-fund incubators are already supported by “ELEFTHO”: Innovative Ventures S.A. (iVen), Euroconsultants S.A. (i4G), I-CUBE, Thermokoitida-(THERMIE) and INI-CUBATOR.

4.4.1 INNOVATIVE VENTURES S.A (iVEN)⁴³

Innovative Ventures S.A. (iVen) is a new, multi-purpose business incubator funded by the venture capital division of the National Bank of Greece. Currently iVen manages a fund of close to € 9million. Its stated mission is to transform innovative ideas into successful businesses by catalyzing the process of starting up and growing companies that produce financially viable businesses in all sectors of the economy. The incubator combines the provision of start-up capital with professional services such as strategic direction, legal support, accounting management, and a strong network of business contacts.

iVen selects and supports innovative business by participating in the share capital of

⁴³ This exposition is based on the information provided on the website of the incubator: www.iven.gr

newly established or existing companies with an investment of up to € 750,000. The tenant company can use this capital to cover its initial operating expenses, perform the necessary market research, and develop and test its product or service, within a time period of 18 months. In addition, iVen assists the company to raise the necessary capital for its development by taking part in the negotiations with banks and venture capital schemes.

The incubator operates from a modern building at a central urban location in Athens (Kallithea), occupying a total space of 450m² allocated as follows: 250m² tenant space, 75m² incubator management, 50m² conference rooms, and 75m² common area. The space is equipped with state-of-the art equipment and technology, including high-speed Internet access lines and the latest communication technology. Each firm occupies its own office and is entitled to use the conference space, fax and photocopying machines, and secretarial and administration services. The companies are charged with additional expenses such as phone bills, stationery and the cost of using other special services.

The incubator provides strategic guidance to the tenants regarding market positioning, the development of business models, and the identification of market trends. In addition, iVen actively advises tenants on day-to-day operations and provides consulting services and guidance regarding strategy, sales and marketing through the management team, outside consultants or through its contact network. The incubator cooperates with the tenants in forming strategic alliances with third parties. Tenants can also access the broad business network of the incubator and its shareholders. Finally, iVen assists its companies with recruiting personnel based on the needs described on the business plan. For this purpose, iVen uses its network of contacts and the services of companies specializing in executive recruitment.

The main criteria for selecting business for location in iVen's premises reflect the prospects offered in the business plan, the competence of the management, and the mutual benefits that can be achieved from the co-operation with iVen. The objective of iVen is to exit its investments when they are ripe via a potential sale of its stake to the capital markets or to strategic investors.

4.4.2 EUROCONSULTANS S.A (i4G) ⁴⁴

The consulting company EUROCONSULTANTS S.A. was founded in 1990 in Thessaloniki. It provides an array of consulting services to a diverse clientele, which extends to the public and the private sectors and covers the international and domestic business arena. EUROCONSULTANTS S.A is the biggest consulting company in northern Greece and one of the largest in the country in terms of work force and turnover. It specializes in high technology projects such as energy saving for SMEs, the development of on-line communication and information business network, quality assurance systems, etc. The company currently offers a wide range of services for high-tech businesses in Greece and is expanding abroad.

In mid-2003, Euroconsultants S.A. started operating a new business incubator named i4G. The incubator is located next to the main facility of the company (Pylaia) and near the S&T park of Thessaloniki. The incubator has a total usable space of 1.775 m², out of which 1.225 m² are cells for incubating 10-15 companies, 275 m² is allocated to the incubator management, and 275 m² is allocated to common use area (2 meeting rooms for maximum 8 persons, 2 seminar rooms with capacity 18 to 50 persons, equipped with data show and sound installation). The incubator offers all typical services to tenant companies including state-of-the-art communications, photocopying, secretarial assistance, library, restaurant, and security, cleaning, and building maintenance services. Its financial support, lies mainly on the following:

- Participation into the incubatees' capital in the form of a long-term investment (3-7 years)
- Usually receives 20%-30% of the equity capital, while its capital participation reaches 49%.
- Provides financial mentoring free of charge
- It invest in start-ups as long as the other partners contribute part of the capital
- Selects capital participation into a variety of business sectors as well as niche markets
- Provides seed capital

⁴⁴ This exposition is based on the information provided on the website of the incubator: www.euroconsultans.gr

The i4G incubator also offers consulting services that relate to:

- Company funding, use of funding tools
- Exploitation of investment opportunities in Greece and abroad;
- Identification of partners and technology suppliers in Greece and abroad
- Market research, export-import data analysis by sector
- Databases of potential suppliers and clients
- Information technology services
- Legal advice
- Transfer of technology and know-how
- Patent development and licensing
- Technology brokering
- Technology management
- General business management
- Quality assurance
- IT (web platform, hosting, networking)
- Logistical services
- Human capital

The incubator involves/assists with the creation of partnerships between tenant companies and partner organizations. i4G also collaborates with several financial partners (Alpha Trust Innovation, National Fund For the New Economy-TANEO, 4E) especially for high-risk investments, in order to offer seed and venture capital. Financing is provided primarily on the basis of participation of the investors in the capital of the tenant company.

Although very new in its present form, there are already fifteen companies in the i4G incubator. It has already designed 50 Business Plans, and accomplished six successful graduations, while its turnover for 2005 has reached 5.2 million €:

YEAR	PERSONNEL	TURNOVER (million €)
2003	48	1.5
2004	82	3.4

2005	105	5.2
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i4G main objectives are:

- Utilize the EUROCONSULTANS presence abroad
- Expand building infrastructure, Investments Funds and Collaborations
- Increase the number of incubatees up to 25-30, as well as funds up to 6-8 m. €
- Gain more financing schemes (VC funds, TANE0)
- Export the know-how and grow abroad.

4.4.3 I-CUBE ⁴⁵

I-CUBE is a technology-oriented business incubator located in a business district just south of Athens. It purports to accelerate the creation of viable commercial enterprises in the Balkans. The incubator aims at bringing together business idea originators (individuals, companies, or research institutions) and investors (venture capital firms, business angels, and I-CUBE itself). It provides initial seed funds as a key incubation offering. Its capital stock is 6.960.000 €, while its turnover in 2005 was 1.600m €. ⁴⁶

I-CUBE offers the following services: market evaluation and competitive analyses, financial planning and business plan design, organization structure setup and business process design, software development and IT infrastructure implementation. I-CUBE uses its experience in the information technologies sector to recognize investment-worthy business ideas and to market them successfully. While the incubator employs a thorough and methodological incubation model, it stresses the importance of independence and flexibility for the new entrepreneurs to nurture their business ideas. I-CUBE emphasizes that the new entrepreneurs maintain intellectual property rights and a significant portion of share capital in the new enterprise.

I-CUBE claims to have established several formal and informal network programs with

⁴⁵ This exposition is based on the information provided on the website of the incubator: www.i-cube.gr

⁴⁶ Information provided by the Conference “The Challenges for Incubator’s Professionals”, SUMMIT, 6-7 April, 2006.

a number of Greek and European collaborators – including research, academic, technology transfer, and business innovation institutions – to assist tenant companies to:

- Access seasoned, professional advice and capital funds
- Access technological know-how, expertise, and human resources
- Achieve economies of scale in resource sharing and purchasing
- Create prospects for joint ventures, business opportunities, and promotion at both the Greek and the European levels.

For instance, one of the partnership networks supports the exchange of information, know-how and technology between current tent companies and companies that have successfully graduated from the incubator. Such sharing encourages business efficiency and enables tenants to focus efforts on the core of their business. Collaboration with other companies also creates economies of scale by increasing negotiating power with common suppliers, improving access to multiple sales channels and allowing for a common communication policy.

Up to now, fourteen companies have been established in the incubator, all specializing in information and communication technologies. From those, thirteen companies are commercially activated, while the one remaining is inactivated. Four companies have successfully graduated, selling their share.

4.4.4 THERMOKOITIDA (THERMIE) ⁴⁷

THERMIE was established in 2004. It is similarly supported by ELEFTHO programme, and its main shareholders are among others IBG Capital S.A (Marfin Group), and Omega Bank. Its stated mission is the support of innovative business ideas through a by providing an extensive set of services such as networking, management, technical support, financing, space rental, and back office services. It operates in a privately owned building of 6.000 m², and its total investment is 15 million €. THERMIE is activated within the broader area of Central Macedonia in northern Greece with a strategy to promote new activities, strengthen regional development, and help establish the Thessaloniki metropolitan area as a center of development for Balkans and East Europe.

The THERMIE incubator provides the following services to tenants:

- Value added services: technological support, business plans, public relations, information technology, human capital, training, quality assurance systems, advertising, etc.
- Supportive services: shared back office services such as accounting, internet, legal consulting, secretarial support, call center, copyright services, etc.
- Financing services: funding support
- Networking Services: business associations, S&T parks, universities, and other companies.
- Business consulting services: actively coaching of tenant firms on establishing viable business plans, also by continuous monitoring of tenant goals and budgets to assure that all promises and plans are implemented and met.
- Office space rental, also including conference and special promotion event rooms

THERMIE has received 300 innovative ideas proposals and business plans from interested companies wanting to enter the incubator. However, after a fully technological and financial evaluation, 21 SMEs are currently hosted in the incubator.

⁴⁷ This exposition is based on the information provided by the Conference “The Challenges for Incubator’s Professionals”, SUMMIT, 6-7 April, 2006.

In particular, those 21 companies cover the following business sectors:

- Medical technologies, Pharmaceuticals, Biotechnology (4)
- Software development for innovative applications (5)
- Mechanical and Electrical hardware, Process systems (5)
- Telemetry, Telematics, Wireless data transfer (3)
- Innovative internet services development (2)
- Environmental technologies (1)
- Agrotechnology (1)

A short-term perspective of THERMIE, that is until the end of 2006, is to increase the number of its incubatees up to 30, and its total equity investment up to 5.5 million € during the same period. Its mid-term and long-term objectives are the focus on medical and environmental technologies with partial exits within 3-5 years, and a realization of a continuous reinvestment policy respectively.

4.4.5 INI-CUBATOR⁴⁸

INI-CUBATOR is a for –profit networked Athens –based technology incubator. Its vision is to boost entrepreneurship in Greece and to support individuals in establishing their own high technology companies. It offers expertise and services in the area of commercialization of R&D results. INI-CUBATOR's investment plan is partly financed by the Greek Ministry of Development, General Secretariat for Research and Technology under the ELEFTHO Programme. The success of the company and the exploitation of innovative ideas in the best possible ways is guaranteed through the participation of INI-GraphicsNet and the close association with the Fraunhofer Institute in Germany.

During an incubation project, INI-CUBATOR offers all of the strategic, managerial and technical support necessary for the development and commercialization of innovative business ideas and technological applications. It provides the incubatees with the suitable office space, telecommunication infrastructure, library access and a space for conference meetings.

⁴⁸ This exposition is based on the information provided on the website of the incubator: www.ini-cubator.gr

From a strategic point of view, a common vision is to initiate a positive “innovation spirit” and therefore an economic success of the innovations made in the area of information and communication technologies. Emphasis is placed on:

- The definition of business activities, which analyses market needs in relation to the existing prototypes, products or services, the market areas which will be targeted, the technology which will be utilized, and the positioning of the proposed activity in the value-adding chain,
- The development of an exploitation and commercialization strategy,
- Technology screening to identify marketable technologies at a very early stage,
- Technology breeding to guarantee best exploiting paths,
- Intellectual property management and patenting support,
- The development of a cooperation strategy with members of the INI-GraphicsNet and its collaborators.

PART 5: CONCLUSIONS

5.1 WHY IS INCUBATION IMPORTANT IN THE CASE OF GREECE:

5.1.1 THE INNOVATION SYSTEM IN GREECE

The economic development of modern Greece has so far mainly been based on the transfer of embodied technology from abroad, the exploitation of natural resources (including the natural landscape and the cultural heritage) and the satisfaction of national demand. Low and medium technology products, which loose ground due to the competition from low labor cost countries, were the primary Greek exports. The educational system concentrated on reforms of the primary and secondary education for higher performances and on growth of the tertiary education sector, while research (Gross Expenditure on R&D) remains at 0.65% of GDP, 70% of which is publicly funded (national and EU).

Civil Service efforts to organize a national innovation system started at the time of Greek accession to the European Communities. This was followed by the introduction of project funding of research in the universities and preceded the provision of grants to industry for RTD projects and the creation of local innovation offices (1980-1985). These early efforts, guided by foreign expertise, failed to give concrete results since they were organized at mid-ranking administrative levels, without clear support from the Government, and their linkages to private initiative remained hectic.

In a fully-fledged innovation system, six types of activities can be distinguished: scientific, technological, transfer from science to technology, development-production, market-consumption and financial. The activities may be implemented by the same or different organizations but they have to develop in a balanced manner and converge to the same or mutually supporting objectives, if the network is to be competitive. The operators of the activities communicate not only among themselves but also with operators from other competing networks from which they can absorb, or provide knowledge, products, services or information. The intensity and effectiveness of communication may be essential for accumulating knowledge and skills and generate innovation and competitiveness.

Greek knowledge production activities (research) are traditionally dominated by the public universities, which perform approximately half of the national RTD. The establishment of parallel structures to the main university administration for funding research projects in the 1980ies (special accounts, research institutes), although resisted for several years by unions of students and several academics, generated new opportunities. Their opening for cooperation with European research institutions and with industry (national or multinational) or other users of research services has been catalytic and created a basis for further development.

Beyond the universities, a number of public research centers contribute to the training of researchers and to the participation of Greece in the international science system. The research centers (which account for 20% of Greek RTD) have largely reproduced the academic system of the universities, paying little attention to their function as “translators” of scientific knowledge into technological information and know-how. Universities and centers demonstrate high performance in publications per researcher or per euro spent on RTD.

The weakest part of the science system in the country is the business sector, which has traditionally depended on embodied technology transfer and foreign technical assistance for its modernization and development. This approach did not contribute to the development of technical education and of life long learning. The emergence of new sectors in the last decade, such as ICT, has improved the situation and the share of the business sector in financing RTD has risen to 30% in 2001. The level of patenting remains extremely low, although there is a rapid increase the last years.

The technological support activities have a short history and limited development. Having been established as public bodies, the national Standards Organization, the Metrology Institute, the Accreditation System and the Patent Office, were transformed into self-financing institutions. A few prototyping laboratories (“innovation centers”) promoted several years ago by public funds did not survive. In the area of science transfer to technology, a number of small corporations created to provide scientific and technical support to the business sector (with emphasis to SMEs) remained stagnant. Public incentives to promote liaison offices in the universities and research centers, as well as private technology brokers, had a very limited effect. The structural programmes

since the late 1980s supported the creation of S&T parks near the research centers, technical RTD semi-public corporations and liaison offices in universities and research centers. Since 2002, the structural programmes give support to private initiatives for the development of intermediary institutions.

In the production sector, the trend is to expand services while agriculture and manufacturing are inactive or even shrinking. Very few clusters can be identified, one of which operates in Western Macedonia, and focuses on furs and apparel. The entrepreneurs operate independently and link strongly to suppliers from abroad. The growing services contain a large amount of low technology activities, while a smaller segment is knowledge intensive. In manufacturing, the traditional industries continue to shrink, while new technology industries emerge with slow pace. The market in terms of demand, adapts rapidly to new consumption behaviors, limited mainly by revenue constraints. This trend has shown up in the positions taken by the associations of industrialists in the last years. The European Innovation Scoreboard (EIS) shows that innovation activities are principally focused on non-technical innovations, on the improvement of existing products and on the adoption of new production processes (reducing costs, standardizing quality). In the latest years, the number of innovating companies increased considerably and reached a share of about 30%. This rise is mostly due to the service sector, while manufacturing, especially very small firms, show a more conservative profile. This increase was insufficient to generate a rapid reduction of the gap between Greek performances, which is lower than that of all other EU-15 Member States, with the EU average.

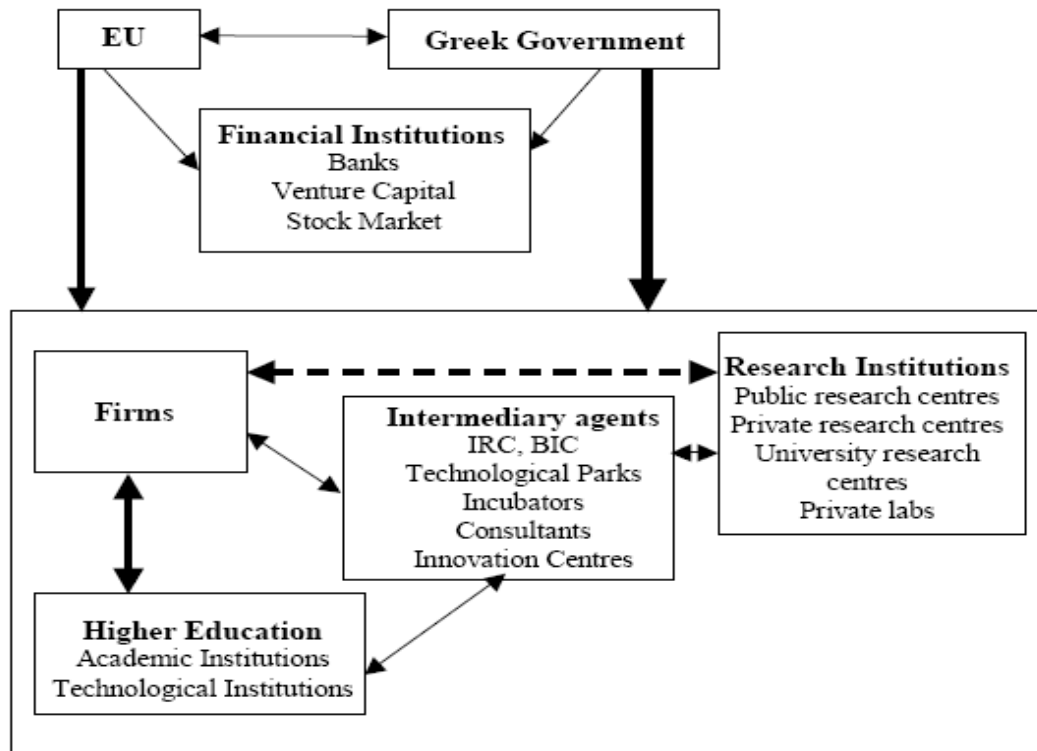
With regard to the financing of activities, public appropriations and bank loans dominate the landscape. The EU plays a critical role in the co-funding of RTD and private investment, both through the Structural Funds and the Framework Programme for RTD. Funds are directed either to RTD or to productive investment. Innovation only received systematic attention after 2000. Direct financial incentives to innovation were introduced after 2002 following an extensive negotiation with the competition protection services of the European Commission. Private and semi-public financing institutions for hi-technology ventures were developed to satisfy a slowly emerging demand.

The main public organizations involved explicitly in innovation funding are the Ministry of Development (MoD), through its General Secretariat for Research and Technology (GSRT), and the Ministry of Economy and Finance (MEF), through the units for Private Investment, Public Investment and Fiscal Policy. The GSRT has been in charge of promoting innovation since the early 1980s, elaborating its own funding schemes and legal instruments, gradually moving from a focus on RTD funding to the support of the exploitation of research results. The instruments they use for policy elaboration and implementation are:

- (1) The legal frameworks (laws, presidential decrees and ministerial decisions) on incentives to private investment, taxation of business firms, operating the public research centers, financing RTD and exploitation of public RTD results and
- (2) The multi-annual programming documents, accompanied by rules for implementation, monitoring and control, related to incentives to private investment, RTD and creation of technology transfer mechanisms.

The National Competitiveness Council, an advisory body to the Minister created in 2003 by the Ministry of Development, brings together representatives of the government and of the private economy. This new body gives a more institutional and systematic character to the cooperation between the government and the business community.

Figure 19: The Greek Innovation System



Source: General Secretariat of Research and Technology, 2002. *Technology Foresight in Greece*, in *Greece 2001: Research, Technology, Innovation*

5.1.2 A SWOT ANALYSIS OF INNOVATION

The national innovation system in Greece presents more weaknesses than strengths. The following SWOT analysis is an evidence of the importance of the incubation process in the case of Greece. The integrated model -as presented in the 3rd part of this essay- is proposed to correspond sufficiently to the needs of the Greek innovative environment. In order to have a complete image on the current situation and prospects of the innovation in Greece and to support the growth of the incubation activity, we should consider the following Strengths, Weaknesses, Opportunities and Threats:

STRENGTHS	WEAKNESSES
<ul style="list-style-type: none"> ➤ Emerging awareness of the importance for global competitiveness and innovativeness ➤ Creativity and positive attitude towards entrepreneurship as a source of individual wealth ➤ Facilitation of networking by EU-wide institutions ➤ “Aggressiveness” of researchers in applying successfully for EU-RTD funds ➤ Increasing perception of the need for public and business RTD, and for high tech patenting 	<ul style="list-style-type: none"> ➤ Lack of innovation component in policy making in education, training and many other public policy areas ➤ Still broad misunderstanding of the developmental processes in the global economy – innovation has no lobby of stakeholders ➤ Product orientation and size of the production sector ➤ Life long learning, lack of trainers and programmes ➤ Perception of intellectual property rights and patenting as a tool for competitiveness
OPPORTUNITIES	THREATS
<ul style="list-style-type: none"> ➤ Exposure to international / global competition ➤ Improving understanding of programme management and long term policy making in S&T and innovation ➤ Further opening of the economies in the Balkan, Black Sea and Mediterranean countries ➤ Labor and capital mobility in Europe and attractiveness of Greece’s mild climate and landscape ➤ Establishment of a national Competitiveness Council, which could promote innovation if adequately supported and led. ➤ New type of structural funds for 2007-13 	<ul style="list-style-type: none"> ➤ Slow adaptation of the educational and training system to the requirements of knowledge intensive entrepreneurship and global competition ➤ Slow replacement of the traditional stagnant companies by new dynamic technology intensive businesses ➤ Inability of the government and civil service to assume the new roles as catalyst of economic and social development. ➤ Technophobic behavior of the population, sensitive to environmental and health problems. Lack of broadly shared consistent vision for the country for the future ➤ Continuation of political instability of the broader region (from western Balkans to Iraq)

Clearly, the national innovation system presents more serious weaknesses than strengths. Its strengths include the “aggressiveness” of the research system, whose success in participating in the Community RTD Framework Programme considerably exceeds the national share in EU-RTD funding⁴⁹.

The weaknesses include a lacking focus of existing research, an only emergent demand for new knowledge for production purposes and technological support mechanisms that are stagnating due to a lack of adequate demand and as a result of ineffective management practices. The lack of appropriate attention paid to the concept of innovation by the policy makers is one major weakness of the system. This may be attributed to lack of understanding of the development process in the modern globalised economy or the limited interest of pressure groups (researchers, entrepreneurs, investors etc).

Familiarization with technology and technological change is also a major issue for the Greek society, bound by the classic education approach and a relatively high social status of liberal professions. The limited technological understanding of the latest technological changes and their impact on the economy, the society and the culture has often led people to embrace techno-phobic attitudes and has delayed the adoption of new technologies introduced from abroad.

Creating a new type of “knowledge entrepreneurship” will change the landscape of the SME sector, which is identified at present by low educational levels and mediocre quality of services and manufacturing. Most experts declare that SMEs are the backbone of the Greek economy, but their structuring and performance looks more like a muscular mass without nerves. The cultural change towards the knowledge economy is probably more urgent than ever.

Against these major weaknesses, efforts are made through the development of policies and measures, favoring a new profile of entrepreneurs and reorienting the strategic behavior of traditional industry towards more knowledge intensive activities. In the core of this strategy are the measures to generate a new entrepreneurial breed. The

⁴⁹ This rate is lower than 1%, while the participation rate of Greek institutions in the Framework Programme is ranges from 3.5% to 4.5%, depending on the year.

corresponding measures provide for the encouragement of researchers from universities and public research centers to establish their own firms or to organize the provision of services to the international industry on a long-term basis, for the development of private S&T incubators and parks, for encouraging investors in high technology areas and for rewarding individual investors. All schemes subsidizing RTD, both academic and industrial, provide for support to patenting expenditures. The membership of Greece in the EPO and the awareness campaigns of the Greek Patent Office in the research centers and universities is accelerating the trend for protecting IPRs.

5.2 HOW THE INCUBATION PROCESS APPLIES IN THE CASE OF GREECE, THROUGH THE INTEGRATED MODEL.

In Greece, technologies are adopted only after have they been tested and applied in technologically advanced countries, or embedded on machines, appliances or products. Furthermore, the expenditure for innovation of industrial firms is significantly lower than the E.U average, as it has been presented in the previous part. This fact significantly limits the capability of Greek firms to be innovative and to gain competitive advantages, by value added products or services. At a national level, 45% of the research effort is made by universities and 30% by firms (2001 data), a fact which is reversed in the case of technologically advanced countries.

Therefore, the incubation activity is of great importance as it is considered to stimulate and enhance the innovative performance and overall competitiveness of the Greek R&D system. The recent trends in this field have shown a progress towards the support mechanisms of the innovation area, but there is always the space for upgrading the tools of this innovating procedure.

The integrated model of incubation, as it is presented in the 3rd part of this thesis, is proposed to reinforce the incubation activity in the case of Greece by giving a special attention to the evaluation process of each incubator's function. This component is included in the 4th phase of the integrated model which is named "Monitoring the first steps" and is best described through the two stages of this phase:

Stage 1: Data analysis

During this stage, the incubator management team accumulates financial and marketing information concerning the graduate tenants, in order to keep a record of their entrepreneurial course. In addition, special annual or semi-annual reports and analysis are made so as to monitor each graduate progress that will eventually help the incubator reorganize or develop its facilities and services.

Stage 2: Evaluation

The second stage provides the incubator with possible suggestions and resolutions for its possible weaknesses. Through the data analysis of the previous stage, the incubator management team, can assess the growth of each graduate company in relation to the effectiveness of the incubator, and thus suggest different approaches to future tenants.

The real added value of an incubator comes not from providing physical space but rather from business support services. Obtaining feedback from tenants and other clients on incubator services is critical to ensuring quality. According to CSES's research, around 40% of incubators rely mainly on informal feedback but a third also have more structured procedures in place and 17% regularly carry out client surveys.

The client-venture has to be monitored continuously, to determine whether its progress is moving in the direction and at the pace envisaged in the business plans. The purpose is to identify emerging problems, analyze the consequences of delays and difficulties, find practical solutions, and mobilize the resources needed for corrective actions. A special Information System could be designed to collect data on progress parameters, from the outset and most importantly after graduation.

The monitoring of the incubator's operations, ensures that performance information is systematically collected, for all the components. The outcomes, when objectively analyzed, reassure the satisfaction of the client and the contribution to the community while corrective actions can be detected in order to overcome weaknesses and for the system be re-engineered so as to realize the benefits.

While the concepts of small business incubation are simple, it is not easy to provide a government decision-maker or private investor with an estimation of the expected benefits from supporting incubators, in the context of competing demands for funds. Few programs have adequately built into their management systems the routine accumulation and analyses of data on the success or failure of their beneficiaries and of the facility itself. Yet it is precisely these longer-term outcomes that validate the usefulness, impacts and sustainability of incubation.

Business incubation involves many players, and the efficiency of each affects the overall effectiveness of the system. Likewise, the evaluation process is multi-faceted, calling for step-by-step analyses of the factors within the incubator and some outside. It must begin at the beginning, that is, with the initial steps of assessing the feasibility and developing the business plan parameters, including the pre-identification of 'markers' of progress and performance.

An evaluation framework can cover three main sets of criteria: Impacts, effectiveness and sustainability. Measures of performance are the medium-term benefits accruing to

the clients, sponsors, local community, region and nation. Some measurable criteria include the enterprises and employment created, growth in the company's assets, sales turnover and exports, corporate and personal taxes generated, survival rates of the ventures incubated, the technologies commercialized and revenues earned by patents and licensing, the numbers of graduating firms and their outputs, and the addition of benefits at incubating clients as compared to those in the open marketplace.

Some of the main disadvantages of the Greek economy, involve a low performance in terms of overall innovation, low expenditures on R&D, the inability of the business sector to innovate and a general stiffness in the areas of knowledge creation and technological innovation. In response to these weaknesses, the efficient evaluation and upgrading of the innovation system and especially of the incubation process which is considered to be one of the most important features in the research and technological development sphere, can efficiently become the fuel to support this insubstantial industry of wealth.

5.3 FUTURE PROSPECTS

Generating an increase in the number knowledge intensive business firms, which would contribute simultaneously to improving many EIS indicators (business RTD, patenting, high tech employment and value added, early stage venture capital), is addressed by various measures of the Operational Programme for Competitiveness. The PRAXE programme [Appendix of Part 5) was presented in last year's report as a good practice in the Greek innovation policy. The ELEFTHO programme (Appendix) which subsidizes private initiatives to establish and develop S&T incubators and parks, complements this scheme. Before ELEFTHO, the Greek 1st and 2nd operational programmes for research and technology (1989- 1993 and 1994-1999) supported a few public parks created nearby existing research centers. Four incubator facilities were created (Research Centre Dimokritos in Athens, STEP-Crete in Irakleio, S&T Park in Patras and Technology Park in Thessaloniki) with very limited impact on the generation of new businesses based on the research activity of the hosting Centers. Moreover, the regional operational programmes of Attica, Epirus and Thessaly funded S&T parks/incubators managed by hosting universities or industrial RTD institutions, with mixed impact on the generation of fast growing knowledge intensive firms. It would make little sense to multiply the number of publicly funded parks when the existing ones were proving stagnant.

Although international practice shows that only a small share of all S&T incubators and parks are privately owned and developed, the Operational Programme for Competitiveness provided for approximately €70 million (50% private funding) for the creation of new incubators and parks. Long discussions with the European Commission's DG Competition cleared the scheme from competition regulations.

The scheme was launched after 2002 and required proposals offering not only material infrastructures for new firms but also consulting services, networking etc. In order to secure the viability of the projects in a globalised economy, international experts evaluate the proposals. Evaluation is not competitive, but all projects satisfying the criteria are selected until exhaustion of the committed budgetary means. This took place in early 2005 with some 10 approved projects. The approved projects are initiated by VCs of banks and consulting companies and focus on ICTs and niche markets of traditional industries (i.e. food). The sole exception is a programme initiated by the

Centre for Marine Research to develop a cluster of companies on marine and aquaculture technologies.

The first projects approved showed that there are still strong difficulties to identify a sufficient number of fast growing knowledge intensive firms to make the investment cost efficient. Nevertheless, the mobilization of the private sector in developing institutionalised linkages between knowledge production and use and their subsequent financing with adequate funds and expert support may amplify the awareness of the researchers and the industry on the challenges of the new economy. The scheme has identified a market failure and the appropriate terms to correct it, reducing the probability for the emergence of government failure to a minimum. The terms of public subsidy are approved at European level and the evaluation of application for grants is based on international expertise. The competition created between public and private incubators may help both to raise their effectiveness. For these reasons, the scheme is not bound to local or national conditions and may be transferable to any Members State of the Union.

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